Collection and Disposal of Unwanted Agricultural Pesticides and Animal Health Products in the Great Lakes Basin

Final Report

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Executive Summary

The goal of this feasibility study is to identify and detail a number of options for the collection and disposal of unwanted pesticides, animal health products and sharps sourced on farms in Ontario, considering the tenets of community-based social marketing (CBSM). Ontario has benefited for a number of years from a collection and disposal program operated by CropLife Canada, an industry association for the plant science industry. For over a decade, within its stewardship activities CropLife Canada has been operating two key programs in Ontario one to collect and safely dispose of unwanted or obsolete pesticides and another to collect and recycle empty commercial pesticide containers. In 2008, a pilot was undertaken to collect unwanted or obsolete animal health products and sharps. Based on its success, during the Ontario-wide CleanFARMS™ collection program in 2009, all three product streams were collected together and safely disposed – pesticides, pharmaceuticals and sharps.

It was important for the study team to consider, with the help of a Working Group of well-advised senior members of the industries involved in the sale and distribution of these products, a number of options that would potentially provide direction for an ongoing future program. However, in investigating these options, the team was also charged with determining the significance to farmers of managing these waste streams and with learning their predisposition and their attitudes toward addressing them.

Through an iterative market research design, the team was able to determine the following indications concerning how farmers view the management of these waste streams and how they might respond to the options for doing so:

- Safe disposal of pesticides and animal health products is described as “the right thing to do” by a large majority (90%) of farmers. A large majority (90%) believe that safe disposal will make their farm operations safer, and slightly fewer also want to avoid enforcement action. A large majority want to show other producers (85%) and consumers (93%) that they are environmentally responsible.
- Farmers strongly believe that proper collection, storage and disposal of pesticides and animal health products is an important part of how they manage their farms. Preventing release of these products into water resources near their farms is as important as preventing the release of manure or gasoline. Release of these products into the environment impacts the water of the Great Lakes.
- Farmers have changed their practices to waste management in the past ten years. Two-thirds believe they are doing all they can in this area, while the balance believe that some improvement is possible. Two-thirds of farmers say they do not have any excess pesticides each season.
- Farmers are managing the waste generated on their farms, using a variety of resources including dealer blitzes for pesticides, veterinarians’ removing excess or unwanted meds and sharps, and on-farm storage, collection services, and on-farm disposal for all three waste streams.

- Farmers believe that no matter what system is put in place, they will pay for it one way or another. However, they also acknowledge that they are prepared to pay their fair share of costs for collection and disposal.
- Farmers want to do the right thing and participate in safe disposal of these products, but do not want it to involve more paperwork or more regulations.
- There is a patchwork of local municipal options, and farmers wonder why their waste cannot be handled in all municipal facilities.
- Farmers say that sorting unwanted products of these types and taking them to a disposal location is not a significant barrier to disposal of unwanted pesticides and animal health products.
- Dropping product off at the purchase location is the preferred option for a majority of farmers (62%). Having these products picked up at the farm is the next-preferred option (20%), and taking them to the municipal landfill is the third-preferred option (14%).

Using these findings, the project team was able to assess the application of the list of options and design an approach that would have a strong probability of success should it be implemented. In fact, the final recommendations of the team are an amalgam of the current approach used by CropLife Canada, and an alternate approach for animal health products and sharps, both complemented by several waste management options currently available and in use in some sectors and in some areas of the province.

The recommended approaches are:

1. A combined, three-stream blitz, operated every three or four years, employing the CropLife Canada model and brand, and
2. A separate animal health products and sharps collection and disposal program using return depots situated strategically throughout the livestock-farming regions of the province, should the three-stream approach not be accepted.

In addition to both, positive on-farm waste management methods, the current availability of return programs at retailer and veterinarian locations for animal health products and sharps, and the use of municipal waste management facilities in areas that continue to accept farm waste, are recommended to be encouraged. These facilities, that operate voluntarily and are habitual channels for product disposal for many farmers, would be actively promoted where available as a natural extension of existing positive practices.

Using GIS mapping techniques, the project team has identified twenty locations in Ontario that would serve as the optimum mix for servicing farmers with either the blitz or the return depot approach, based on their drive-time limitations and the relatively intensity of farming across the province. Frequency of collection blitzes could not be objectively determined with available information. Some participant responses and some high-level modeling suggest that the four-year cycle used by CropLife Canada may be too long for some farmers, but no objective criteria for outcomes, for example a volume target and/or a number or

percentage of farmers participating, have been established that would guide these considerations. However, given the generally-positive predisposition of farmers, a successful communications and promotion program, and some regional tests to determine differential responses, the frequency for collection and disposal events could be refined.

Cost estimates on the proposed alternatives and on several of the source options provides an indication of the required budget for each program element, and the cost-effectiveness of the alternatives overall. The cost per participant and/or the cost per unit collected can be used to compare options. However, the overall cost of the program compared to the revenue value in each product stream or its cost relative to the value of agriculture in the province significantly reduce cost as a factor in the implement-ability of such a program.

Governments may be challenged to entertain ongoing funding support for this type of program, but would appear to be willing to assist in preparatory and design activities. The concept of “extended producer responsibility” applied in other sectors of the economy will continue to anticipate the participation of the pesticide and pharmaceutical industries in the collection and disposal of wastes generated by the use of their products. And farmers acknowledge and accept their responsibility to pay a portion of the cost of collection and disposal of the products they use. These factors appear to provide a good basis for agreement on funding for a province-wide program.

Implementation of either option would apply CBSM approaches, given that these behaviours have been modeled by farmers for several years in the target communities, and that their goal is generally accepted as “the right thing to do” by participants. In fact, it is likely that a good proportion of the farm population would agree with this sentiment, whether they have participated in previous collection blitzes or not. That said, there is a group of farmers who cannot be expected to participate in any program, opting rather to ignore or delay any response to collection and disposal programs for these products.

Consideration of the enforcement of a training and education program for the handling, storage and safe disposal of animal health products and sharps is recommended to parallel the successful mandatory pesticides certification program introduced in the past decade. This approach provides a parallel experience for all farmers who have completed or who are aware of the pesticides program, and places both initiatives within a common concept for waste management, consistent with the farmers’ view.

The project team would like to acknowledge the participation of the Working Group members and thank them for their guidance and support through the development of these solutions: Deborah Brooker, Russell Hurst, Mary Lou McCutcheon and Lilian Schaer. The project team also thanks the members of the Steering Committee for their participation and insight: Ron Campbell, Tracey Firth, Barry Friesen, Heather Hargrave, Victoria Hickey and Craig Richardson.

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includes this feasibility study, is co-ordinated by AGCare and also supported by Canadian Animal Health Institute, Ontario Agri Business Association, Ontario Farm Animal Council and and Ontario Veterinary Medical Association.

1 Introduction

1.1 Background

As society continues to become more aware and committed to reducing our impact on the environment we change the way we look at waste. Over time, farmers accumulate small amounts of agricultural pesticides, animal health products and sharps that cannot be used. The product may have expired, concerns over their efficacy may exist, products may have been de-regulated, or the farm resident may have ceased farming. These unwanted products need to be disposed of properly for health, safety and environmental protection. To do so sometimes requires farmers to change their older disposal practices for these items and to adopt new behaviours for storing and safely managing the waste materials.

Humans are creatures of habit; therefore, facilitating behaviour change is not an easy task. Using the principles of community-based social marketing has been shown to be very effective at bringing about behaviour change. Information, awareness, and economic self-interest are not always reasons enough for people to change their behaviour. Community-based social marketing (CBSM) draws heavily on research in social psychology which indicates that initiatives to promote behaviour change are often most effective when they are carried out at the community level and involve direct contact with people. The CBSM approach involves identifying barriers to a sustainable behaviour, designing a strategy that uses behaviour change tools, piloting the strategy with a small segment of the community and finally, evaluating the impact of the program once it has been implemented across a community.[1]

This feasibility study investigates the many ways to design and operate a collection and disposal program for unwanted pesticides, animal health products and sharps used on farm. Simultaneously, an investigation of the current disposal practices of farmers and the benefits and barriers of farmers potentially changing their current behaviour to collection and disposal programs was investigated. The result of this study articulates the "best" program options which have considered the barriers to behaviour change and been designed to remove or reduce the impact of as many barriers as possible.

1.2 The History of Proper Disposal of Unwanted Pesticides, Animal Health Products and Sharps in Canada and Ontario

In 1989 CropLife Canada began operating its container collection program. The Alberta government asked the industry to develop a solution for the masses of pesticide containers which became waste each year. Although initially displeased by the government pressure to solve the problem and reluctant to accept ownership of the issue, CropLife Canada began its container recycling program.

Today Canadian farmers return to over 1100 retail points on average 70% of all pesticide containers shipped into the marketplace. The containers are then either shredded or shipped to a recycling centre where they

[1] Fostering Sustainable Behaviour, Doug McKenzie-Mohr, c 2006-2009 http://www.cbsm.com/pages/guide/preface.

are re-processed into plastic beads to make field drainage tiles and various other low contact recycled products. CropLife Canada is a world leader in pesticide container recycling and frequently hosts visitors from other countries to share their success in environmental stewardship and assist other countries in developing their own recycling programs.

In 1998 CropLife Canada began its obsolete pesticide collection program. The Atlantic provinces' governments requested the industry *do something* about obsolete products stored on farms: thus the genesis of CropLife Canada's obsolete pesticide collection program. CropLife Canada held a collection blitz to collect obsolete products which were then transferred to a high temperature incineration facility for disposal.

The success of both the empty container recycling and obsolete pesticide collection programs generated significant consciousness for proper end of life product management within the industry. As the programs continued, the importance and commitment to stewardship has become not just a marketing or public relations tactic but a core value of CropLife Canada and it is supported and funded CropLife Canada member companies.

Both of these programs stemmed from insistence from government agencies that some form of product stewardship needed to be undertaken. CropLife Canada believes that if they had not decided to operate these recycling and collection and disposal programs, the government would have eventually developed regulations which may or may not have been more costly and more difficult to abide by.

To date there has been no major push from government, industry or farmers to develop collection and end-of-life management programs for animal health products and sharps used on-farm. However, industry groups and government have recognized the need for safe handling and disposal of livestock medications for several years.

From 1993 to 1996 Ontario Ministry of Agriculture and Food (OMAF) offered workshops on the safe use of livestock medicines. In 1996 the Dairy Farmers of Ontario initiated discussions with other commodity groups regarding an industry-wide program which led to the creation of the Livestock Medicines Education Committee (LMEC) in 1998. The key focus areas for the LMEC are listed below.

- The responsible use of livestock medicines on-farm involve a team approach, including the veterinarian, feed supplier, over-the-counter medicine outlets, the farmer and other farm staff.
- Responsible use, storage and disposal of livestock medicines require a thorough comprehension and compliance with label directions.
- Records and animal identification are an integral component of responsible livestock medicines use.

Curriculum was developed for the Livestock Medicine Education Program (LMEP) for several livestock / poultry sectors. The first workshops began in 1999. The original intention of the LMEP was that it would be similar to the Grower Pesticide Safety Course and would become a mandatory program all livestock producers would be required to take and pass a certifying exam which would allow them to purchase

livestock medicines. Without the certification farmers would be unable to purchase the products. At the time the course began, a number of livestock sectors were facing difficult financial times therefore the government chose not to make the program mandatory.

The voluntary course is still offered through University of Guelph, Ridgetown Campus. The workshop manual discusses proper disposal options for unwanted livestock medicines and used sharps, but the actual disposal options are not necessarily available to all farmers or may be cost prohibitive.

In 1999 OMAF initiated a pilot program with local agribusinesses in Eastern Ontario. *Bring it Back* established collection depots for unwanted animal health products and used sharps at ag retail locations. Farmers would bring unwanted animal health products and sharps to the retail location free-of-charge. The retailers would store the products in specially-designed pharmaceutical pails and sharps containers. When a pail or set of containers was full, the retailer would contact Medical Waste Management to collect the full containers. The pilot ended in January 2005.

In 2004 De Schutter Consulting Service of Guelph prepared the Livestock Medicines Education Program Policy Development Consultant Report. In this report the issue of disposal of unwanted livestock medicine and sharps is noted. Various disposal options were outlined with their pros and cons.

In 2008, a steering committee comprised of representatives from AGCare, Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA), the Canadian Animal Health Institute (CAHI), CropLife Canada, the Ontario Agribusiness Association (OABA), the Ontario Farm Animal Council (OFAC) and the Ontario Veterinary Medicine Association (OVMA) started the Collection and Disposal of Unwanted Agricultural Pesticides and Pharmaceuticals project. The objective of the project was, "to provide the foundation of a comprehensive program for sustainable on-farm waste management with an ultimate goal of designing a solution that is feasible for all farming regions in the Ontario Great Lakes Basin."[2]

Phase one of the project was to operate a small collection pilot at six sites across Ontario. During the collection blitz unwanted animal health products and sharps were brought by farmers to the blitz locations. The objective of the pilot was to learn from the experience and to use that information for a province-wide collection blitz in 2009. The 2008 pilot was a success based on the amount of product received, the positive comments from the participants and the learning that took place by the pilot organizers.

Phase two of the project was to operate a full collection blitz across the province in 2009 for unwanted pesticides, animal health products and sharps. In concert with the collection blitz this feasibility study, using the principles of community-based social marketing CBSM), has been undertaken to identify workable options for collection and disposal of these unwanted agricultural products.

[2] Report on Pilot Project for Collection and Disposal of Unwanted Agricultural Pesticides and Pharmaceuticals in the Great Lakes Basin

Currently, for unwanted pesticides, CropLife Canada's collection blitz provides a relatively equal opportunity geographically for farmers to dispose of unwanted products. For unwanted animal health products and sharps there is no permanent program available to all farmers for the disposal of these products. However, the need for a service is on the minds of producer groups and government.

1.3 The Issue at Hand

Unwanted pesticides, animal health products and used sharps need to be disposed of properly. Farmers accumulate these unwanted products through several means:

- Purchasing a farm that has unwanted products remaining on-site
- Changing farming operations so the product is no longer needed
- Having product remaining after a growing season or after the animal is finished using the product which over time becomes damaged or expired
- Purchasing too much product which over time becomes unusable
- Improper storage contributing to the product's becoming unusable
- Using needles and scalpel blades for vaccinating and treating animals and doing small surgeries as a normal farm practice
- Ceasing farming activity.

These unwanted pesticides, animal health products and used sharps need to be disposed of properly to ensure they do not harm the environment, farm families, animals and anyone required to handle the products during their lifecycle.

While there are various options currently available, Ontario farmers do not have a consistent, reliable and cost-effective program through which to properly dispose of all three product streams. In the absence of such a program, most farmers do want to act responsibly and have established various practices for disposal of these three waste streams. In these circumstances, however, the suitability of some of these practices and their overall impact on water quality as part of the province's environmental stewardship principles is of concern.

Ontario wants an effective method for farmers to dispose of these unwanted products. To be successful the program needs to be meaningful, in that it:

- Has good participation among farmers and they appreciate the service,
- Withdraws appreciable amounts of unwanted products from the farming community and disposes of them properly,
- Operates at reasonable cost and effort for the volumes removed,
- Contributes to the positive momentum of behaviour change towards more sustainable agricultural practices,
- Illustrates that industry, farmers, government and consumers are concerned, aware and acting responsibly regarding the environment, and
- Is flexible and responsive regarding changes to the industry.

Why is it important to dispose of these products properly? Who is responsible for the products throughout their lifecycle? How do other jurisdictions deal with similar issues? How do you establish a meaningful, successful program? How do you get farmers to participate? How much does it cost to establish and operate a program and who pays for it? This feasibility study works its way through these questions to recommend a set of feasible solutions.

1.4 Importance of Proper Disposal

Pesticides are part of conventional farming practices. They need to be applied properly for the safety of those handling the products and for the crops themselves. They are a highly regulated product falling under the jurisdiction of the Pest Management Regulatory Agency (PMRA), a division of Health Canada. Prior to a pesticide being brought to market in Canada, a manufacturer must submit data to the PMRA to prove the product is effective and is safe for use when used as directed on the label[3]. Once registered by PMRA, these products can be used by licensed exterminators and certified growers. While all products are certified as safe to use by the PMRA, like many products, they cause harm to humans, animals or the environment if not handled properly.

Animal health products developed in Canada are carefully designed and tested to protect human and animal health and the safety of Canada's food supply. The Veterinary Drugs Directorate evaluates and monitors the safety, quality and effectiveness of veterinary drugs administered to food-producing and companion animals.[4], and sets standards for and promotes their prudent use. The Veterinary Biologics section of the Canadian Food Inspection Agency regulates animal vaccines. “To meet the requirements for licensure, veterinary biologics must be shown to be pure, potent, safe, and effective when used in the target species according to the manufacturer's label recommendations. In addition, the licensing submission must also contain supporting data demonstrating that the product can be manufactured and used without adversely affecting animal health, human health, food safety or the environment.”[5]

Where there are animal health products used for animal health, there are usually sharps to dispose of. The challenge with sharps is in their handling. Loose sharps remaining on the farm can be dangerous to people and animals if not handled and stored properly and can be dangerous to anyone involved in the disposal process, particularly if they are unknowingly mixed in with other waste. An effective method to dispose of sharps used on farm can help prevent injuries and the spread of disease.

Disposing of unwanted products properly is the final step in the product lifecycle for a very small percentage of pesticides and animal health products sold. It is important that reasonable, cost-effective options are available to farmers to prevent the pesticides and animal health products from being released into the environment in an unsafe manner.

[3] Grower Pesticide Safety Course Manual c 2006 University of Guelph Ridgetown Campus.

[4] Health Canada http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/hpfb-dgpsa/vdd-dmv/index-eng.php.

[5] http://www.inspection.gc.ca/english/anima/vetbio/vbpbproge.shtml#a2.

According to the field survey completed as part of this project, farmers agree that proper disposal of pesticides and animal medicines is important for the environment and farm management practices. Farmers want to *do the right thing*. The cost of crop protection products and livestock medicines are such that farmers try to ensure they purchase only what is required. The amount of product that becomes obsolete is small, but it does exist and farmers need an effective mechanism to dispose of it.

1.5 Extended Producer Responsibility

During the second half of the twentieth century expanding world population, improved manufacturing processes and increased disposable incomes were three major contributing factors to the amount of consumer purchasing and therefore garbage produced worldwide. Towards the end of the century and now into the twenty-first century concern over our environment has become part of our social conscience. The challenge of how to handle waste is a global issue. "Worldwide, jurisdictions are grappling with how best to promote waste diversion and are adopting frameworks based on the principles of extended producer responsibility (EPR). EPR is premised on making those who put products and packaging into the marketplace responsible for managing the waste associated with them. ERP shifts the responsibility for waste diversion to those that are best able to influence and control decisions throughout the lifecycle of a product or package."[6]

"By and large, businesses today do not account for the full costs of the products and/or packaging that they produce. Environmental impacts from production of products and packaging wastes are not reflected in the prices of a packaged product, nor are the costs of end-of-life management. This means that many of the costs of managing and disposing of waste are borne by society and not by the producers or users of a given product or package."[7] The minister's Report on the Waste Diversion Act 2002 Review goes on to discuss that this gives little incentive for manufacturers to consider the environmental impacts of their products and packaging. Having the producer pay for the environmental impacts of production and end-of-life management gives them incentive to think about upstream and downstream impacts which may affect their decisions about material selection, production process, product design, appropriate packaging and end-of-life management.[8]

The concept of EPR in the agricultural sector suggests a partnership between the producers, distributors and users of pesticides, animal health medicines and sharps. These products are used in wide-spread locations and are often used of applied by professional intermediaries as well as by farmers themselves. While the producers or first-importers of these products, under EPR principles, would have responsibility for their end-

[6] From Waste to Worth: the Role of Waste Diversion in the Green Economy. Minister's Report on the Review of Ontario's Waste Diversion Act 2002. Ontario Ministry of the Environment, October 2009 p2.

[7] From Waste to Worth: the Role of Waste Diversion in the Green Economy. Minister's Report on the Review of Ontario's Waste Diversion Act 2002. Ontario Ministry of the Environment, October 2009 p 3.

[8] From Waste to Worth: the Role of Waste Diversion in the Green Economy. Minister's Report on the Review of Ontario's Waste Diversion Act 2002. Ontario Ministry of the Environment, October 2009 p 3.

of-life disposition, distributors, intermediaries and farmers have a role as agent in their management and disposal.

In Ontario, as in other agricultural jurisdictions, some animal health products are imported for use by farmers themselves. Some estimate that this channel may represent 30% or 40% of the volumes used in the province. In this case, the farmers, as first importers, would have the overall responsibility for end-of-life disposition.

Ontario believes and is moving in the direction that "successful economies of the future are green economies, ones that reshape and refocus policies, investments and spending to deliver better results for the environment and the economy."[9] Ontario is proposing to use the principles of EPR as the foundation for Ontario's waste diversion framework.

1.6 Products and the Environment

Pesticides and animal health products break down over time by microbial, chemical or photo degradation. The time it takes for a pesticide or animal health product to break down once it is released into the environment differs from product to product. During the time in which it takes the product to break down, the pesticide or animal health product can move within the environment in various ways.

Some pesticides will bind to certain soils and then the soil can move through erosion. Some pesticides are volatile and their vapour can drift. Pesticides can move through surface runoff into streams, rivers and wells. Pesticides dissolved in water can leach through the soil into groundwater or through tile drains to surface waters.

Pesticides can be released in the environment through:

- Normal practice of applying pesticides
- Spills
- Back-siphoning of pesticides from the spray tank into wells during tank filling
- Improper disposal of unwanted product, pesticide containers or excess spray mix.[10]

Pesticides are designed to be used on listed crops, according to specific directions in specific circumstances. All of these considerations are to improve the effectiveness of the product and to reduce the impact of the pesticide on the people that handle the product and the environment.

Animal health products can be released in the environment through animal excretions and improper disposal of accumulated amounts of unwanted product. The scope of this project looks only at unwanted products that need to be disposed of.

[9] From Waste to Worth: the Role of Waste Diversion in the Green Economy. Minister's Report on the Review of Ontario's Waste Diversion Act 2002. Ontario Ministry of the Environment, October 2009 p1.

[10] Grower Pesticide Safety Course Manual c 2006 University of Guelph Ridgetown Campus

Accumulated amounts of unwanted animal health products that are flushed down the drain will end up in septic systems or sewage treatment plants. Accumulated amounts of some animal health products can affect the microorganisms of septic tanks and this would cause farmers additional problems. Any animal health products that ended up in community sewage facilities would undergo primary, secondary or tertiary treatment before being released into the water. The treatment available will affect the state of the animal health product and therefore its potential impact on the environment.

Individual animal health products will have differing impacts on the environment depending on the nature of the product, the volumes and where in the environment they are released: near a watercourse, on to different soil types, buried in landfills, in septic systems, etc.

1.7 Education, Training and Awareness

The agriculture industry and the crop protection industry promote proper handling and the safe use of pesticides through education and customer service. The Grower Pesticide Safety Course is a one-day mandatory course farmers must take and pass the accompanying examination to become a certified grower. The certification is required for farmers to be able to purchase agricultural pesticides. The certification lasts for five years and then farmers must re-certify. According to farmers in the focus group convened in this study, the course has been instrumental in raising awareness of the potential environmental impact of pesticides and the importance of proper handling. The vendors of crop protection products are also required to take a two-day pesticide safety course geared specifically to the vendors, and the resulting certification is again valid for five years. The product manufacturers are also involved in encouraging the awareness of proper handling and safe use of pesticides. The manufacturers work to ensure labelling and package design make for easy handling and assist farmers in calculating the required amounts. The product manufacturers also provide toll-free customer service support.

The crop protection industry operate a very successful container recycling program to reduce the amount of container waste entering landfills and to repurpose the materials into something of value. This program collects approximately 70% of pesticide containers sold annually. Farmers at the focus group stated that the container recycling program is a “great program”; they all use it and do not want it to change. Ag retailers encourage farmers to return their pesticide containers for recycling once they are empty.

The agriculture industry, the animal health industry and veterinarians promote the safe use of animal health products through education and customer service as well. The Livestock Medicine Education Course is a voluntary course through University of Guelph, Ridgetown Campus. Similar to the Grower Pesticide Safety Course, it teaches farmers about proper handling and usage of veterinary medicines. Components in the course include product safety, environmental impacts and proper disposal methods. Farmers are not required, however, to take the Livestock Medicine Education Course to be able to purchase veterinary medicines. Animal health companies work to ensure that product labelling and package design assist farmers in proper handling and in purchasing the required amounts. They also provide toll-free customer service

support. Farmers use their veterinarians as a credible resource on medications, dosages, proper handling and disposal options.

1.8 Government Commitments and Regulations Regarding Disposal

1.8.1 Pesticide Act

As mentioned earlier, farmers are required through the Pesticide Act to complete the Grower Pesticide Safety Course and pass the exam to be able to purchase pesticides. Through the course farmers learn about the Pesticide Act and are taught how to transport and handle pesticides, calibrate equipment, calculate rates, and spread, store and dispose of pesticides. Section 4a of the Pesticide Act states that users of pesticides are not allowed to impair the quality of the environment by using pesticides improperly:

> "4. No person, whether acting or not acting under the authority of a licence or permit under this Act or an exemption under the regulations, shall discharge or cause or permit the discharge of a pesticide or of any substance or thing containing a pesticide into the environment that,
>
> (a) causes or is likely to cause impairment of the quality of the environment for any use that can be made of it greater than the impairment, if any, for such use that would necessarily result from the proper use of the pesticide;"[11]

Farmers use pesticides carefully, to yield the best results for their farm and to ensure they do not cause any damage to their farm and the environment. Farmers are also aware that if it can be proved that they have caused damage to the environment through the improper use of pesticides, they could be held accountable.

Over the last thirty years the combination of government regulation, education and awareness by the industry and consumers, mandatory training of farmers, and enforcement has changed the way farmers handle pesticides. Farmers in the focus group stated, *"We used to spray the fields until they were white with the pesticide or spray any extras on the road to empty the sprayer on the way home from the field."*[12] Today their understanding of the dangers of improperly using pesticides and the threat of enforcement contributes to the serious approach they take to using pesticides and disposing of them properly.

1.8.2 Ontario Water Resources Act

"The purpose of the Ontario Water Resources Act is to provide for the conservation, protection and management of Ontario's waters and for their efficient and sustainable use, in order to promote Ontario's long-term environmental, social and economic well-being."[13] The Act is very clear on what is considered impairment to water and that anyone who impairs or allows the impairment is guilty of an offence.

In section 1 (3) impairment to the water is defined:

[11] http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90p11_e.htm#BK3.

[12] Strategic Research Associates AGCare Feasibility Study – Focus Group Dialogue.

[13] http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o40_e.htm.

"(3) For the purposes of this Act, the quality of water shall be deemed to be impaired by the discharge of material if the material or a derivative of the material enters or may enter the water, directly or indirectly, and,

(a) the material or derivative causes or may cause injury to or interference with any living organism that lives in or comes into contact with,

(i) the water, or

(ii) soil or sediment that is in contact with the water;

(b) the material or derivative causes or may cause injury to or interference with any living organism as a result of it using or consuming,

(i) the water,

(ii) soil or sediment that is in contact with the water, or

(iii) any organism that lives in or comes into contact with the water or soil or sediment that is in contact with the water;

(c) the material or derivative causes or may cause a degradation in the appearance, taste or odour of the water;

(d) a scientific test that is generally accepted as a test of aquatic toxicity indicates that the material or derivative, in diluted or undiluted form, is toxic;

(e) peer-reviewed scientific publications indicate that the material or derivative causes injury to or interference with organisms that are dependent on aquatic ecosystems; or

(f) the material or derivative has a prescribed characteristic or is a prescribed material. 2005, c. 12, s. 2 (3)."

In section 30 polluting water is prohibited:

"Section 30, (1) Every person that discharges or causes or permits the discharge of any material of any kind into or in any waters or on any shore or bank thereof or into or in any place that may impair the quality of the water of any waters is guilty of an offence. R.S.O. 1990, c. O.40, s. 30 (1)."

1.8.3 Environmental Protection Act

"The purpose of the Environmental Protection Act is to provide for the protection and conservation of the natural environment."[14] The Environmental Protection Act, Regulation 347 Waste Management, section 1 states,

"(1) "agricultural waste" means waste generated by a farm operation activity, but does not include,

(a) domestic waste that is human body waste, toilet or other bathroom waste, waste from other showers or tubs, liquid or water borne culinary waste,

(b) waste from a sewage works to which section 53 of the *Ontario Water Resources Act* applies,

[14] http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90e19_e.htm.

(c) a dead farm animal within the meaning of Ontario Regulation 106/09 (Disposal of Dead Farm Animals) made under the *Nutrient Management Act, 2002* or a regulated dead animal within the meaning of Ontario Regulation 105/09 (Disposal of Deadstock) made under the *Food Safety and Quality Act, 2001*,

(d) inedible material within the meaning of Ontario Regulation 31/05 (Meat) made under the *Food Safety and Quality Act, 2001*, or

(e) any material that is condemned or derived from a carcass at a registered establishment within the meaning of the *Meat Inspection Act* (Canada);"

Further on, in section 3 (1), the regulation states,

"3. (1) The following wastes are exempted from Part V of the Act and this Regulation:

1. Agricultural wastes."

It could be interpreted through this Act and Regulation that farmers are able to bury agricultural waste products on their land, but to do so in an unsafe manner would be a poor decision. If the agricultural waste were found to contaminate the environment there could be adverse consequences to the farmer.

1.8.4 Waste Diversion Act, 2002

"The purpose of this Act is to promote the reduction, reuse and recycling of waste and to provide for the development, implementation and operation of waste diversion programs."[15] The Act establishes the corporation Waste Diversion Ontario with the responsibilities of:

5. Waste Diversion Ontario shall,

(a) develop, implement and operate waste diversion programs for designated wastes in accordance with this Act and monitor the effectiveness and efficiency of those programs;

(b) seek to enhance public awareness of and participation in waste diversion programs;

(c) seek to ensure that waste diversion programs developed under this Act affect Ontario's marketplace in a fair manner;

(d) determine the amount of money required by Waste Diversion Ontario and the industry funding organizations to carry out their responsibilities under this Act;

The Waste Diversion Act was reviewed in 2008/09 by the MOE. The report proposes a number of changes to the current act. The public comment period closed January 11, 2010. Using the principles of extended producer responsibility is one of the themes being proposed to decrease the amount of waste being generated.

1.8.5 Canada-Ontario Agreement on Respecting the Great Lakes Basin Ecosystem (COA)

COA helps Canada meet its commitments under the Canada-U.S. Great Lakes Water Quality Agreement (GLWQA), to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem. "COA has been in place for almost 40 years and was renewed for the sixth time in

[15] http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_02w06_e.htm.

2007. Since signing COA, measurable improvements have been made including major reductions of persistent toxic substances including 89% of high-level PCBs since 1993, and 86% of mercury and 89% of dioxins/furans since 1988"[16] as well as other positive improvements.

"Annex 2 of COA continues the important work to virtually eliminate legacy pollutants, such as PCBs, dioxins, furans and mercury. It also focuses on reducing releases of harmful pollutants from municipal wastewater effluents, as well as air pollutants, which cause smog. Reduction of other harmful pollutants of concern will be achieved through the development of a new program for the sound management of chemicals in the Great Lakes Basin. This program will work with specific industrial and business sectors as well as the public. There will also be more work on improving our understanding of the links between environmental quality and human health."[17] It is through Annex 2 of COA that funding was available to support this feasibility study.

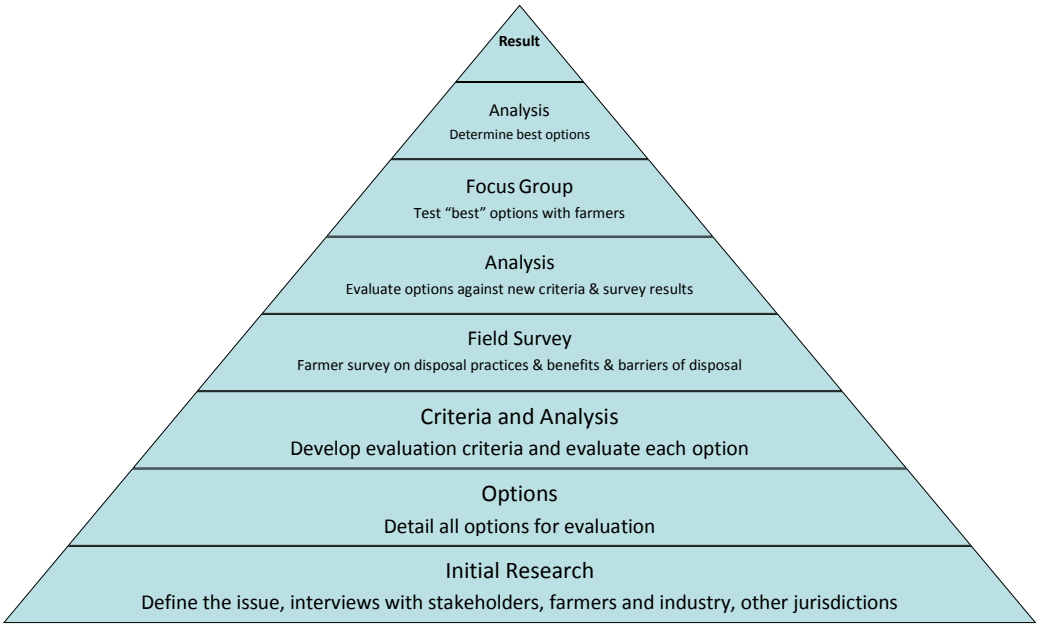
[16] The Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem – RENEWED COMMITMENTS TO THE GREAT LAKES.

[17] The Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem – RENEWED COMMITMENTS TO THE GREAT LAKES.

2 Methodology

The methodology for this study was chosen to ensure that potential program options were analyzed using various evaluation tools to determine an effective method(s) for farmers to dispose of unwanted pesticides, animal health products and sharps. As well, the methodology needed to identify and detail a program that could be successful when implemented.

To complete this feasibility study extensive desk research, field research, option design, evaluation criteria development, analysis and documentation was undertaken to determine an operationally-workable, fact-based solution. A working group made up of members from AGCare, CropLife Canada, OMAFRA and Synthesis Consulting provided feedback and direction throughout the course of the project. The steering committee made up of the working group plus members from CAHI, CleanFARMS™, OABA, OFAC, OMAFRA and OVMA provided valuable operational knowledge, research, contacts, direction and analysis for the project.



The research was a cumulative process throughout the entire project. As the research progressed, the options were developed. The evaluation criteria were developed to consider the needs of those who may sponsor, fund, deliver, benefit from and use a collection and disposal program in the future. The analysis of the options occurred in stages. The weakest / least viable options were eliminated mid-way through the project by the steering committee based on their fit / lack of fit to the specific evaluation criteria. A second analysis session reduced the number of viable options based on additional criteria and supported by the

learnings from the field survey. While several were eliminated in this manner, beneficial and/or useful aspects within them were maintained for enhancement of the resulting options. The final recommendations are uncovered in this study based on their ability to meet the evaluation criteria, and their selection was supported by the results from a statistically-significant random survey of 387 Ontario farmers, and confirmed in a producer focus group.

2.1 Research Areas

The research phase of the project was cumulative and ongoing throughout the entire project. Interviews were held with each of the steering committee members and often additional colleagues from the sponsoring organizations. Farmers, OMAFRA livestock specialists, producer association managers, private industry involved with waste management, other organizations involved with waste management, municipalities, veterinarians, pharmacists, volunteers with the collection blitz, and other government representatives were interviewed to learn from their experiences. Follow up web research was conducted on these organizations.

A number of research papers, regulations, marketing texts, consultant reports and program evaluation reports were reviewed to learn about the issue and identify potential solutions. As the project progressed, the areas of focus during the interviews and desk research progressed. Learnings from existing or past programs, how other geographical or industrial jurisdictions deal with waste, applicable Acts and Regulations, current government direction, strategies to promote behaviour change, option costs and operational details were all researched.

2.2 In-depth Producer Interviews

Six in-depth producer interviews were held at an early phase of the project. The farmers were from a mix of commodity types, demographic categories and behavioural criteria and were farmers who have been both active and inactive in past disposal programs. The purpose of the in-depth producer interviews was to gain insight and guidance for the specific questions to be included in the quantitative survey.

2.3 Field Survey

A quantitative survey on the current behaviours, likelihood to change behaviours, benefits and barriers to participating in collection and disposal program was completed by 387 random Ontario farmers. A random sample of 384 participants ensures a statistically significant +/- 5% response.

The field survey was completed by Strategic Research Associates, a professional market research company in Guelph, Ontario. The telephone surveys were completed through September and October 2009, working around the harvesting schedules of farmers. The survey questionnaire is found in Appendix B. The results of the survey provided insight into how farmers view this issue, and allowed the project team and steering committee to focus the options that would best meet farmers' needs. Findings also provided direction to likely sources of and support for behaviour change among farmers.

2.4 Focus Group

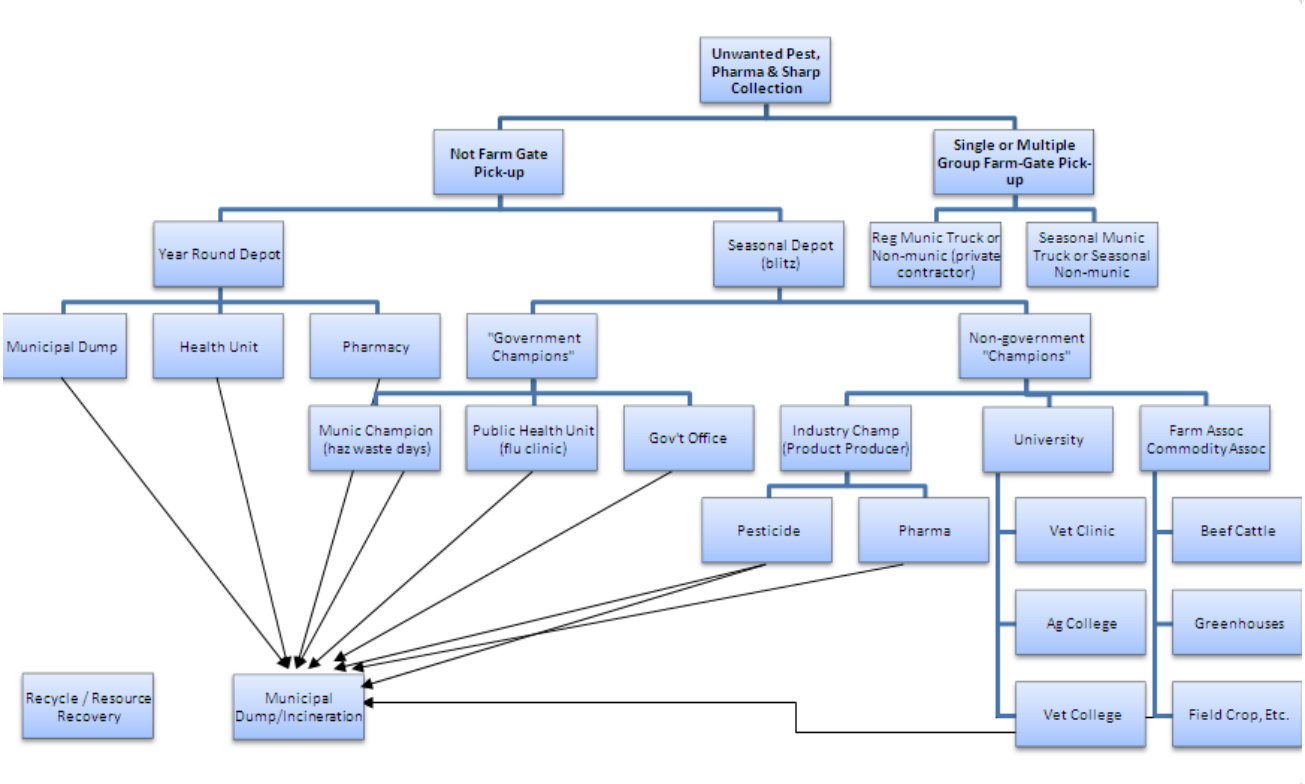
Following analysis of the quantitative survey, a focus group of nine local farmers was convened by Strategic Research Associates. All of the attending farmers were mixed-commodity farmers that have livestock. They farm in Wellington, Waterloo, Halton, Dufferin and Brant counties. There was a mixture of both demographic and behavioural attributes. The purpose of the focus group was to further investigate the short-listed collection and disposal program options. The session placed the program options within the current behaviours of the farmers and detailed further the benefits and barriers of behaviour change. This qualitative research allowed the project team to test the options with farmers and to learn first-hand the context in which these farmers view collection and disposal of unwanted pesticides, animal health products and sharps.

2.5 Determining the Potential Options

After the initial desk research had been completed the project team held a brainstorming session to consider all of the potential program options that could be designed.

2.5.1 Unwanted Product – Flowchart

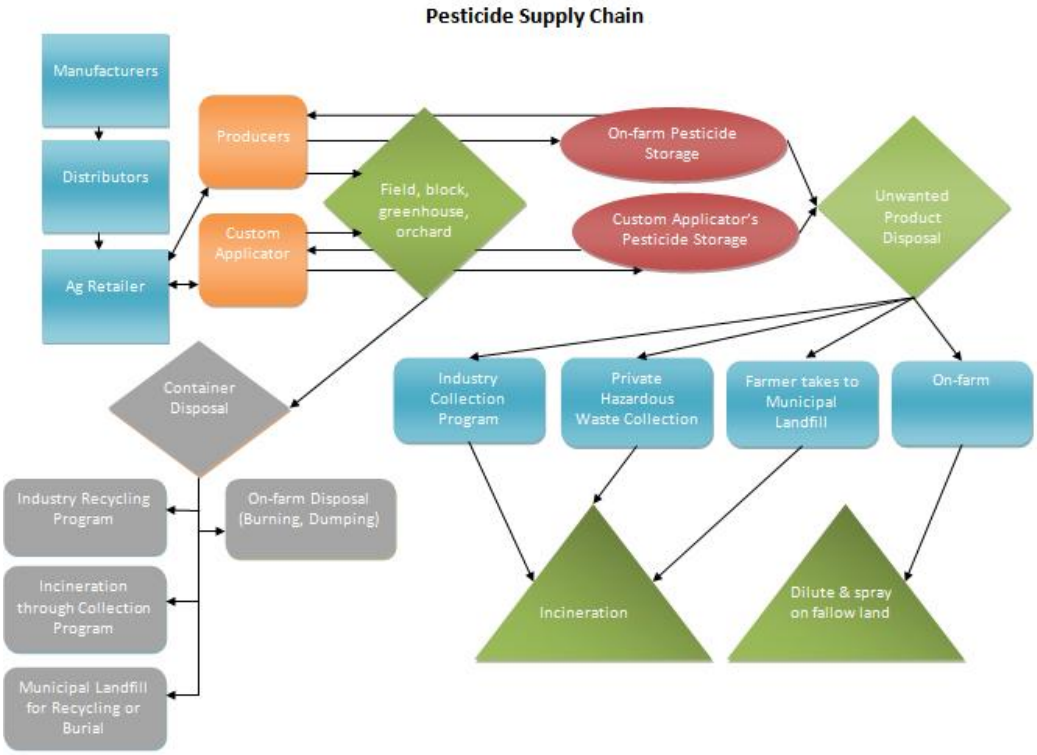
In order to understand the full range of potential solutions, and to illustrate their elemental differences, the flowchart inserted below was employed. In a series of steps that describe how and in what circumstances waste products of each of the three types might find itself to a collection point, the diagram offers a view of the many opportunities for collection points, using the structure of the industry within which it is generated.



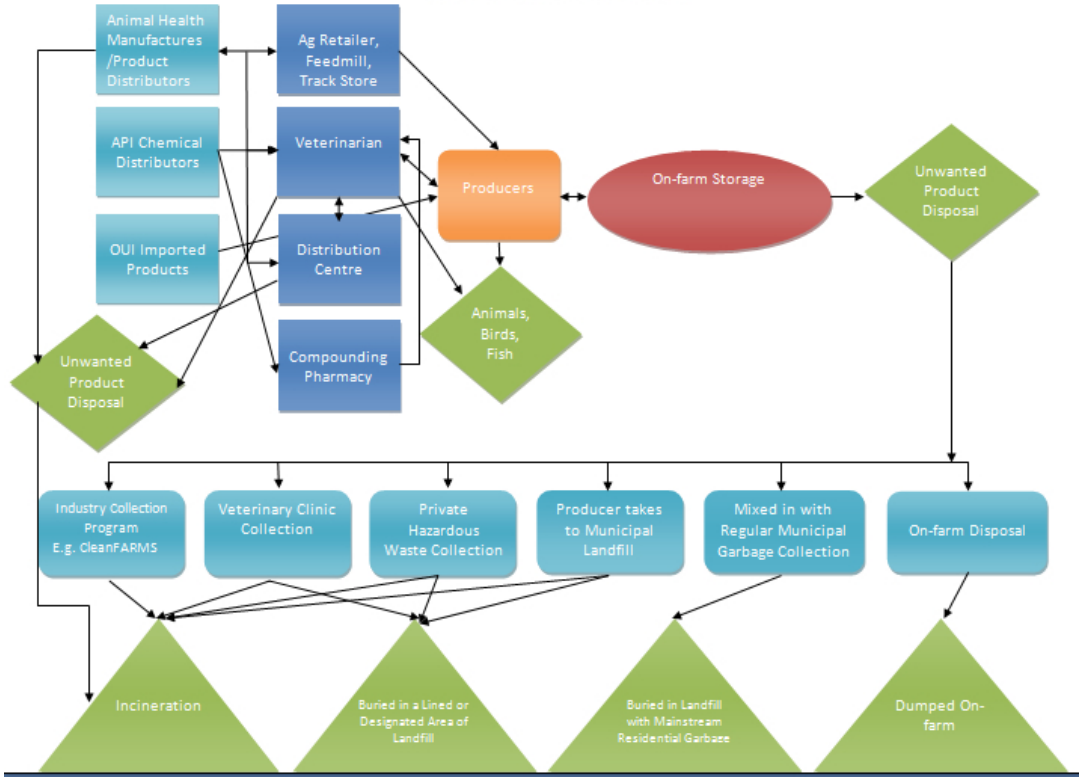
The project team considered:

- On-farm solutions and off-farm solutions
- On-farm product pick up and farmers delivering the products to a central location
- Year round, seasonal and sporadic solutions
- Combined product streams and individual product streams
- Potential partners including ag retailers, veterinarians, government, ag colleges, pharmacies, municipalities and private sector.

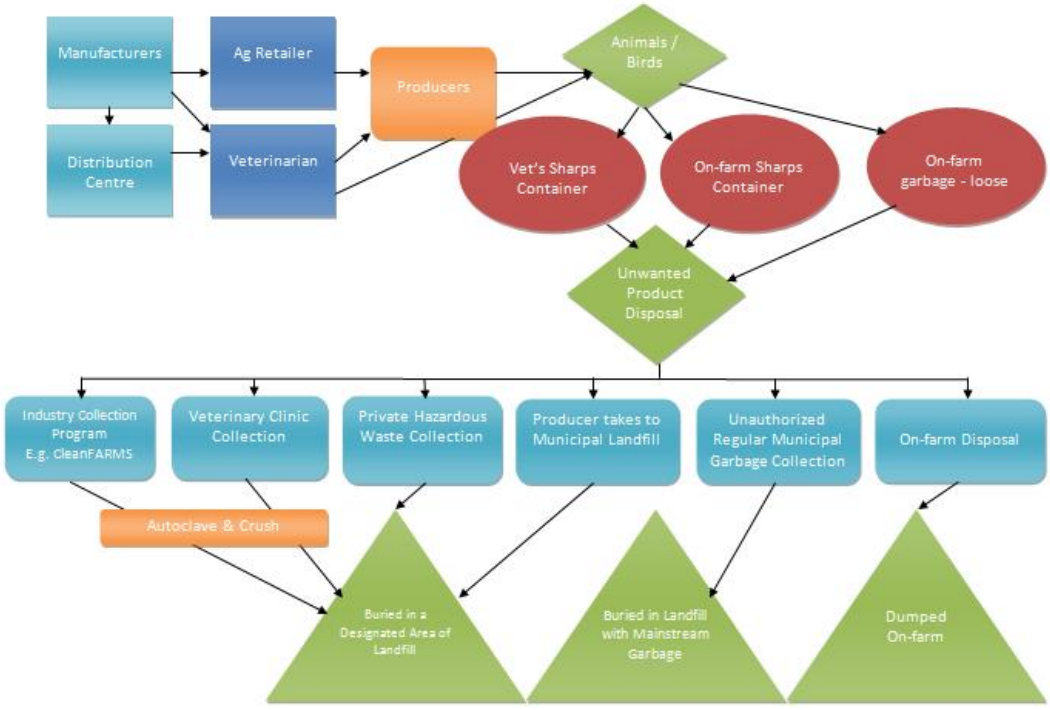
With the assistance of flowchart diagrams to record all of the product movement in each of the product streams, the project team generated 16 options that were provided to the steering committee for their consideration. These are described fully in section 3. The supply chain maps reproduced below illustrate the complexity of the product movement from the manufacturer to its end use.



Animal Health Supply Chain



Sharps Supply Chain



The acceptable option for disposing of accumulated amounts of unwanted pesticides and animal health products at this time is high temperature incineration. The collection blitzes, municipalities and veterinary clinics that collect these products employ the services of private waste companies to dispose of these products in this manner. Used sharps that are collected through these channels are autoclaved, crushed and buried in a landfill. It is possible that over time there could be changes in the waste management industry that could allow for recycling or resource recovery for sharps but this is not currently an available option.

2.6 Criteria

To evaluate the 16 options a set of criteria was developed by the project team in consultation with the working group:

- The program's ability to meet needs of the project as stated in the feasibility study proposal
- The program being simple for farmers to use
- The program being operationally simple for the lead and partnering organizations to coordinate
- The program's ability to be established and operationally stable within 18 months
- The program's ability to produce measurable results for the industry
- The degree to which the program is aligned with government direction.[18]

Following from the working session with the steering committee, three variables were identified that would need to be assessed for each option: frequency, location and cost. When available, the field research provided some answers that were used to guide the determination of frequency for each of the streams, and to identify optimal locations based on respondents' willingness to travel for the purpose of disposing of unwanted products. Costs for some elements of the options could be developed from the CropLife Canada experience; some options displayed intrinsic costs that could be modeled for the analysis.

2.7 Analysis and Evaluation Approach

The steering committee independently evaluated the 16 program options on the original criteria categories, using a quantitative scoring system developed for the project. Their evaluations thus secured, a working session was convened to establish consensus on the inclusion of options for further study.

After the working session the remaining options were consolidated and further researched. Concurrently, the field research was underway and soon yielded results that supported the analysis. The remaining options were then evaluated by the project team considering the additional variables of frequency, location and cost. The results were shared and approved by the steering committee.

A multi-dimensional analysis approach was used by the project team to assess each of the remaining options based on the research collected, evaluation criteria and the field survey and focus group results. It was important to assess not just the "do-ability" of a program, but the likelihood of farmers to participate. Designing a program that specifically reduces the barriers to the desired behaviour and capitalizes on the benefits will help ensure that the best option(s) becomes a successful and meaningful program.

[18] See Appendix G for further detail on the evaluation criteria.

2.8 Documentation and Reporting

Throughout the course of this project on-going communication with the working group has occurred primarily through the working group meetings and their documentation. The project team has met with the full steering committee four times during the project to share our planned approach, evaluate options and to present and discuss results. Two interim reports have been submitted to the project sponsor. This final report is the cumulative result of all of the desk and field research, analysis, details and results.

2.9 Areas not Addressed

It should be noted that two key elements were not in the scope of work of this feasibility study, both of which could have some impact on the potential programs identified. These two programs are:

- Risk Assessment – It is commonly accepted that all three of these products require careful handling to ensure safe end-of-life management. During this study, a risk assessment was not conducted that would identify the risk associated with current or proposed management techniques for the products. A detailed risk assessment may impact the final decisions made on the method of end-of-life management.

- Quantitative Assessment – Because a program has been running across Canada for obsolete pesticides for over ten years, good data exists about the volumes of obsolete pesticides available. However, the same is not true for pharmaceutical products or sharps. Prior to developing any programs for these products, the quantity of products sent to market and those ending up as waste products may be identified as an input to the design of the management system.

3 Options

Sixteen options were initially considered for the collection and disposal of unwanted pesticides, animal health products and sharps. Each option was sketched out to facilitate a shared understanding of the options and to allow discussion and analysis to occur. The options are essentially differentiated on three key variables: location, frequency and products included. The "location" dimension incorporates whether the process occurs on-farm or off, the number of locations and the type of off-farm facility used. The "frequency" factor includes the number of occurrences in a given time period and its duration. Products included are differentiated on multiple versus single-product focus, and the specific combinations thereof. The 16 original options are briefly described in the following paragraphs.

3.1 Single Stream Collection Blitzes

Location	Frequency	Products
Off-farm Blitzes held at ag retailers or other accessible facilities Number of locations to be determined by requirement	To be determined by need CropLife Canada's pesticide blitzes have been held once every 4 years in each region, with a duration of 3 days	Pesticides or Animal health products

CropLife Canada has operated three pesticide collection blitzes in Ontario since 2001 and they have been very successful and well-received by farmers.

3.2 Combined Stream Collection Blitzes

Location	Frequency	Products
Off-farm Blitzes held at ag retailers or other accessible facilities Number of locations to be determined by requirements	To be determined by need CropLife Canada's pesticide blitzes have been held once every 4 years in each region, with a duration of 3 days	Pesticides, animal health products and sharps Animal health products and sharps

There were believed to be some economies of scale to collect pesticides, animal health products and sharps together. This option may be more convenient for mixed farmers who are able to dispose of multiple waste streams at once. The 2009 CleanFARMS™ collection tested this model with good success.

3.3 Provincial Sweep

Location	Frequency	Products
Off-farm Blitzes held at ag retailers or other accessible facilities Number of locations would be greater than the CropLife Canada blitzes with the intention of increasing the volume of material collected	The blitzes would occur frequently over a short period to "clean" the province of these unwanted products	Any or all of the product streams

This option may be considered if there were a major reason to sweep the province clean of unwanted pesticides, animal health products or sharps during a short window of time. Reasons to operate this type of model could include; suddenly discovering a product can cause serious harm to people, animals or the environment or the decision to hold an amnesty period by industry or government prior to a policy or operational change e.g. farmers not being able to store expired products on farm or having to pay for their disposal.

3.4 Point of Purchase Return Depots

Location	Frequency	Products
Off-farm Products returned to point-of-purchase	Products can be returned any time during regular business hours	Animal health products and /or sharps

When the point-of-purchase has collected sufficient volumes they contact a disposal company to collect and properly dispose of the products. A small pilot similar to this model was held at five retailers in Eastern Ontario from 2000 to 2005. This is an "always open" model.

3.5 Return to Veterinarian

Location	Frequency	Products
On-farm and / or off-farm Products are returned to the vet during a farm visit or to the clinic	Products can be returned any time during regular clinic hours or whenever the vet is on farm	Animal health products and /or sharps

When the vet has collected sufficient volumes of product they contact a disposal company to collect and properly dispose of the products. This model was considered because some veterinarians already offer this service to their customers, they sell animal health products and sharps and they already have a mechanism to dispose of their own medical waste.

3.6 Mobile Farm Supply Pick-up

Location	Frequency	Products
On-farm Products are picked up by a company that already makes farm visits (e.g. DACO)	Products are picked up on the regular schedule of the mobile farm supply company.	Pesticides, animal health products and sharps or any combination

The mobile farm supply company properly stores the unwanted products until sufficient volumes have been collected to arrange for the proper disposal of them. This model investigates the convenience and ability to have on-farm pick-up combined with another on-farm service provider.

3.7 Bookmobile

Location	Frequency	Products
Off-farm Products are returned to a specialized truck which parks each day in consistent locations in agricultural areas	The exact frequency would be determined by needs. The concept works as a regular service with greater frequency e.g. every 2 weeks, once a month	Pesticides, animal health products and sharps or any combination

The bookmobile model concept is modeled after mobile libraries and is a conceptual model considered for this project, rather than an actual service that exists. The trucks park in regular locations for a day and then travel back to their yard at night. This service is available much more frequently than the blitz option.

3.8 Toxic Taxi

Location	Frequency	Products
On-farm Farmers call the toxic taxi to pick up unwanted products as required	Calls can be made at any time. The toxic taxi service would establish a convenient time to arrange the pick-up	Pesticides, animal health products and sharps

This model investigates the convenience of the on-farm pick-up. Toxic taxis are currently used in the City of Toronto and the Region of Greater Sudbury for any household hazardous waste.

3.9 Municipal Waste Disposal

Location	Frequency	Products
Off-farm Farmers take the unwanted products to their municipal landfill	The frequency is determined by the individual municipality (e.g. hazardous waste days, during landfill hours, does not accept agricultural waste products, etc.)	Pesticides, animal health products and sharps or any combination

This option explores the ability to work with municipalities to dispose of unwanted pesticides, animal health products and sharps.

3.10 Private Collection and Disposal

Location	Frequency	Products
On-farm Farmers call a private waste management company to pick up unwanted products as required	Calls can be made at any time. The waste management service would establish a convenient time to arrange the pick-up	Pesticides, animal health products and sharps

This option is currently available to all farmers.

3.11 BUD Method – Buy what you need, use what you buy, dispose of it properly

Location	Frequency	Products
BUD method does not address where or how to properly dispose of any unwanted product that does accumulate	Daily	Pesticides, animal health products and sharps

BUD is an education and training component that should be part of any waste management strategy. BUD also may require a behaviour change among some consumers. BUD does not address the actual collection and disposal of unwanted pesticides, medicines and sharps.

3.12 On-farm Disposal

Location	Frequency	Products

On-farm Farmers dispose of their unwanted products on their own land	As required	Pesticides, animal health products and sharps

In this model farmers dispose of products as they see fit on their own land. This model explores both acceptable and unacceptable on-farm disposal methods. This option was considering because there are acceptable on-farm disposal methods that farmers use and are encouraged to use for small amounts of remaining pesticides.[19] This option was also included to ensure that the study considered all options, even those that risk inclusion of some that are considered unacceptable by society.

3.13 Go Organic

Location	Frequency	Products
On-farm	Daily	Pesticides, animal health products and sharps are not used in agriculture so there is no disposal issue

In this model, all farms convert to organic production so that once the province is clean of unwanted pesticides and animal health products there should be no new unwanted product generated. Although this is unlikely in the foreseeable future, this model was developed to ensure the project team was considering all potential options.

[19] Applying registered pesticides at the label rate or less to fallow land or to a label crop following the label guidelines are acceptable on-farm disposal practices for pesticides.

4 Findings

The environment is important to most developed countries around the world and they are all grappling with how to minimize negative environmental impact without serious consequences to their economies. Some countries, and even regions within countries, are further ahead in their environmental policy and initiatives than others. Ontario is committed to a green economy, incorporating a wide range of programs and priorities, and is working to reduce its environmental footprint.

Proper disposal of agricultural waste overall is seen as an important issue to OMAFRA. For pesticide container recycling and collection and disposal of unwanted pesticides, Canada is considered a leader around the world. However, unwanted animal health products and sharps used in agriculture have not yet been addressed in the overall context of agricultural waste. That being said, it is a problem that can be solved.

4.1 Other Jurisdictions

4.1.1 Issues and Insights 2008 Jurisdictional Review

In 2008 Issues and Insights completed a Jurisdictional Review for Collection of Unused Pharmaceuticals and Sharps Used on Farms and Obsolete Crop Chemicals. The purpose of the review was to find best practice systems for collecting and disposing of animal medical wastes and obsolete pesticides. For animal health products they found, "that there is currently no similar program in existence that could be used as a basis upon which to build a collection and disposal system in Ontario." For obsolete pesticides they found, "the crop protection industry has been very effective in working with industry stakeholders, governments and NGOs to collect and dispose of obsolete crop pesticides around the world. Canada ranks in the top three countries of the world for pesticide container recycling. Canada has a very successful collection program for obsolete pesticides and containers."[20]

4.1.2 New Zealand Agrecovery

The Agrecovery Foundation was established as a not-for-profit trust in New Zealand in 2005. Agrecovery operates product stewardship programs for obsolete pesticide, chemical containers and plastic bale wrap. Its trustees are made up of members from the farmers' federation, government, producer associations, the animal health and crop protection industry and a New Zealand dairy cooperative. Agrecovery is funded by agrichemical companies, local government, retailers, industry organizations and farmers.

Agrecovery's obsolete pesticide collection program differs from CropLife Canada's program in a few ways. Farmers in New Zealand must register their unwanted products. Identifying what the product is and how much exists helps determine if Agrecovery will pick up the product on farm or ask the farmer to bring the product to a collection day. If the product is to go to a collection day, Agrecovery will contact the farmer

[20] Jurisdictional Review for Collection of Unused Pharmaceuticals and Sharps Used on Farms and Obsolete Crop Chemicals by Issues and Insights, November 2008.

once enough product has been registered to warrant operating a collection. The requirement of farmers registering was driven by how the program is funded. Agrecovery needs to know how much member-company and non-member-company product is being brought in. Farmers bringing in non-member products are required to pay for the disposal prior to the event. Also, the local government funds the disposal of any persistent organic pollutants.

It is not mandatory for agrichemical companies to support Agrecovery. Companies that do pay a levy to Agrecovery, incorporate this cost into the product pricing. If farmers have obsolete products from a company that supports Agrecovery the disposal is free to the farmer. If the farmer's obsolete product is from a company that does not support Agrecovery, the farmer has to pay a disposal fee. Currently there are 39 committed brand owners and Agrecovery is actively recruiting more.

The obsolete pesticide program began last year and so Agrecovery do not know how often they will run collection blitzes; however, they expect they would hold one in each region every year. On-farm pick-up by Agrecovery is always an option available to farmers, but it is expensive. Unwanted animal health products are also collected through this program but farmers must pay the disposal fees.

Agrecovery also runs a pesticide container recycling program and a bale wrap collection program. For the bale wrap program farmers purchase bale wrap recycling bags for approximately $1 per bale wrap. When the recycling bag is full of bale wraps, the farmer contacts Agrecovery to schedule a pick up. Bale wrap can either be dropped off at the recycling centre or Agrecovery picks up the bale wrap on-farm within 90 days. The bale wrap is then recycled. New Zealand uses approximately 320,000 km of bale wrap every year. Most of the bale wrap was either buried or burned prior to the establishment of the Agrecovery program. It is interesting that farmers in the focus group for this feasibility study were far more concerned about bale wrap waste than any other agricultural waste stream.

4.1.3 United States Environmental Protection Agency

In the United States, most states operate obsolete pesticide collection programs under the name of Clean Sweep. The programs are similar in nature to CropLife Canada's obsolete collection programs but are led by various agencies across the country. The lead agency is generally the State Department of Agriculture or the Pesticide Regulatory Agency. Regardless of who is the lead, the collection is nearly always a cooperative effort involving the state extension service, other state agencies, county and local governments, industry associations and other interested individuals.[21] Clean Sweep programs are funded in several ways: state pesticide registration fees, other fee-based funds, state general funds, participant fees, Environmental Protection Agency grants, county funds, in-kind services and other grants.

There are three main methods of collection; single day events, permanent sites and onsite pick-ups. Single day events are the most commonly used method. Several states encourage farmers to register before the event. This allows the contractors to better organize and plan the event. The target audience is determined

[21] http://www.dep.state.fl.us/waste/quick_topics/publications/shw/cleansweep-pesticides/EPACleanSweepReport2001.pdf.

by the lead organization. Farmers are the main target but some states allow golf courses, garden centres, retailers and homeowners to participate.

Some of the main challenges faced by the lead organizations include obtaining funding, generating awareness, complying with hazardous waste regulations, addressing liability issues, overcoming distrust of government programs and dealing with problematic waste streams.

Because the programs are run by various agencies, states and counties across the country it is difficult to compile total results and report the overall success. In the 2001 EPA Clean Sweep report results are positively reported and organizers are appreciative of the many agencies' hard work in organizing and operating collection programs.

4.1.4 British Columbia Unwanted Pharmaceutical and Needle Return Programs

British Columbia has developed successful return programs for human pharmaceuticals and sharps in response to provincial government regulatory requirements. Most pharmacies in the province accept used needles from their customers. The pharmacy pays for the proper disposal. A list of pharmacies that accept needles can be found on the B.C. Pharmacy Association website.[22]

In 1997 B.C. Provincial Cabinet approved a stewardship program regulation. This regulation required all brand-owners of medications sold in B.C. to provide a way for consumers to dispose of their unwanted medications, in an environmentally responsible manner. Government gave brand-owners until the end of that year to submit a program for approval, failing which the government would form an association to develop a stewardship program on their behalf.

The industry formed the Post Consumer Pharmaceutical Stewardship Association (PCPSA) in response to the regulations. PCPSA organizes the collection and disposal program for unwanted prescription and non-prescription medications and natural health products from consumers and collects the required funds from the product manufacturers to support the program.

There are no direct charges to consumers or pharmacies for this program. Payment comes from the manufacturers or first importers of these products into the province. Consumers take unwanted medications to their pharmacy where they are collected and properly stored. The medications are picked up as required and sent for safe destruction at a licensed incineration facility.[23] It is essential to note the importance of government regulation and enforcement to facilitate improvements to environmental programs and behaviours: the PCPSA and the resulting program came into effect because the industry had no other choice.

[22] http://www.bcpharmacy.ca/public-health-links/sharps-pharmacies.htm.

[23] http://www.medicationsreturn.ca/faq-brand-owners_en.pdf.

4.1.5 Nova Scotia Diabetic Needle Return Program

Nova Scotia Environment, the Canadian Diabetes Association, the Pharmacy Association of Nova Scotia, needle manufacturers and the municipalities in Nova Scotia came together to form a stewardship / partnership agreement for the safe disposal of needles used in the home.

Most of the sharps used in the home are used by people with diabetes. They can require a large number of needles and lancets for proper monitoring. The problem of what to do with the used needles became a problem when municipal curbside recycling was introduced. Through provincial health promotions, people with diabetes were encouraged to put their used needles in puncture-proof containers and throw them in the garbage. When curbside recycling collection started people with diabetes began putting the needles stored in containers into their recycling box. At recycling facilities, much of the recycling material is hand-sorted. This exposed workers to the possibility of being stuck by needles, a mishap that actually occurred on a few occasions. Diabetes is not an infectious disease but used needles in general have a rightfully-gained stigma. The problem was further complicated when Halifax Regional Municipality began hand sorting the waste stream as well. Needles were no longer wanted in either the recycling or the waste stream, and therefore a new solution needed to be found.

Spearheaded by Nova Scotia Environment, stakeholders for used needles identified all of the options and agreed on a stewardship program. Under the joint stewardship agreement, people with diabetes receive free sharps containers supplied by the needle manufacturers. When the containers are full, customers return the containers to the pharmacy. The pharmacies dispose of these containers at their local municipal landfill. Nova Scotia Environment negotiated with municipal disposal sites a protocol whereby waste haulers from pharmacies could bring the used needles directly to a landfill for immediate burial, thereby avoiding any hand sorting of the waste. Not having to ship needles further than necessary for their end disposal also reduces their environmental footprint.

The agreement required the willingness of several parties to work together and included education about the safe management of used needles, small financial commitments for the used needle containers and small time-commitments by the different partners. This stewardship agreement is a good example of all parties sharing the responsibility of the end-of-life management for used needles generated in the home for the overall benefit of the environment and for the protection of waste management workers. One of the attributes of Nova Scotia's program was that it had the support of all retailers of new needles through the Canadian Diabetes Society and the Pharmacy Association of Nova Scotia. All sales of needles were captured through these organizations. This provided for a level playing field and ensured there were no free-riders on the program. Therefore, manufacturers were willing to participate.

Ontario could follow this type of example to resolve needles used for agriculture and potentially for unwanted animal health products, provided that a safe, cost effective disposal option is identified for the waste products. The challenge for these sectors is that it would require strong leadership and commitment from the agriculture industry to develop a program as there would be numerous parties to bring onside with

perhaps with less incentive than the human pharmaceutical industry has in supporting customers with diabetes.[24]

4.1.6 Ottawa Public Health Sharps Campaign

Ottawa Public Health operates a free sharps return program for residents in the Ottawa region. The campaign was initiated in response to occupational health and safety concerns for municipal workers being stuck by needles of unknown sources. Approximately 30 needle drop boxes are located across the city in public buildings, pharmacies and hospitals. Residents are encouraged to put needles into a puncture-proof container and take them to a drop box for disposal. Ottawa Public Health pays for their disposal. Drop boxes are not monitored and there is no paperwork required by those using the service.[25] This drop-box type program could work very well for sharps used on farm. There is low overhead and it would be easy for farmers to use. Partners would need to be found, a lead organization and funding determined.

4.1.7 Stewardship Ontario

"Stewardship Ontario was established in 2002 by industry stakeholders as an Industry Stewardship Organization in response to the Waste Diversion Act, 2002. Stewardship Ontario's current purpose is to develop, implement and operate a waste diversion program for paper materials and packaging wastes (Blue Box) and, more recently, municipal hazardous and special wastes (MHSW). Their goal is to promote the reduction, reuse and recycling of those materials managed under their programs."[26]

Stewardship Ontario currently has two main programs; the Blue Box program for residential recycling and the MHSW program for municipal hazardous or special wastes. While Stewardship Ontario is the key industry funding organization for designated materials for Blue Box and for MHSW, most of the work carried out by Stewardship Ontario is done by outside contractors. That includes collecting, recycling, and disposing of designated materials, collecting and distributing fees from designated stewards and all promotion and education activities. It is managed by a Board comprised of large retailers, large manufacturers and industry associations for designated materials.

Under both the Blue Box program and the MHSW program, Stewardship Ontario uses municipalities for the collection of most of the designated materials. Municipalities, in turn, use private sector industries to manage the products collected. Stewardship Ontario arranges, through its contractors, for payment to municipalities for its share of the costs. Some materials such as paint and batteries collected through retailers are managed outside of municipalities. Stewardship Ontario arranges, again through its own management contractors, for other contractors to process the materials collected by the retailers. In all cases, Stewardship Ontario never takes possession of, or owns, any of the designated materials.

[24] Businesses tend to support the organizations that they benefit from. Diabetes is a "profitable" disease for the pharmaceutical companies, needle manufacturers and pharmacies which would make those parties more willing to support programs that help their customers with diabetes.

[25] http://www.ottawa.ca/residents/recycling_garbage/special_items/needles_en.html#P15_790.

[26] http://www.stewardshipontario.ca/corporate/index.html.

Under the MHSW program, a fee per unit of product produced is charged to each designated steward (e.g. the manufacturers of paint, antifreeze, single-use battery, etc). When these products are returned on municipal household hazardous waste collection days, the fees collected by Stewardship Ontario are used to reimburse municipalities for all costs for collection, transportation, processing reuse and recycling and disposal. Starting in July 2010 pharmaceuticals and sharps produced for residential use will also be included in this program.

Stewardship Ontario's MHSW program could be part of a solution for solving the funding, collection and disposal of unwanted animal health products and sharps for the agriculture industry; however, there are five key problems with this approach:

1. It could be very costly because if the municipalities or retailers collecting the products are not responsible for costs, they may not be motivated to establish cost control methods in their operations

2. Not all municipalities would participate (as indicated in polling responses conducted in this study), possibly leaving large areas without service

3. Provincial regulations for operating these programs are very stringent and complex. In some cases, a municipality may be prevented from accepting these materials because of the regulations even if they wanted to do so

4. It could be very costly to the manufacturers and/or the farmers. Manufacturers would need to add the Stewardship Ontario levy into the product price. Increasing costs of animal health products could be a burden for farmers with very narrow margins. For the Canadian animal health industry, adding the levy to the product price creates an additional challenge since there are strict federal regulations regarding the way that patented products are priced in Canada. If the manufacturers could not share the disposal costs with their customers, there may be additional down-stream competitive consequences to the animal health industry in Canada.

5. Determining how to design the collection and disposal program would become complicated because Stewardship Ontario would not easily be able to collect fees from the farmers who are the first importers of active pharmaceutical agreements and imported finished products. These are estimated to be one-third of the total amount of animal health products used for agriculture in Ontario.[27] To have a level playing field the collection and disposal program would need to be designed so that the users of Canadian animal health products are not paying for the disposal costs of imported products.

[27] Benchmarking the Competitiveness of the Canadian Animal Health Industry, by the International Federation for Animal Health, 2006.

While Stewardship Ontario is a mechanism to fund the recycling and disposal of products, collection and disposal programs still need champions to organize and operate them. In most cases Stewardship Ontario works with municipalities through their household hazardous waste collections or Blue Box programs. For agriculture, there is an added wrinkle that many municipalities do not collect agricultural waste at MHSW depots. How to operate a collection and disposal program would still need to be determined and a champion found to organize the collection if Stewardship Ontario was involved in the funding solution.

4.2 Stakeholder Interviews

There are many stakeholders interested in the issue of collecting and disposing of unwanted pesticides, animal health products and sharps used on farm. During the research phase of this study ten members of the steering committee were interviewed individually, representing several industry sectors. In addition, fourteen municipalities were contacted, six veterinary clinics, three livestock and poultry specialists from OMAFRA, the Chief Veterinarian of Ontario, numerous farmers and a number of volunteers from the collection blitzes were interviewed to capture a balanced view on this issue. The interviews showed there are diverse views on management and disposal of unwanted pesticides, animal health products and sharps.

Pesticides were generally viewed by all those interviewed in this study as being of greater risk to the environment than animal health products if not handled properly. Animal health products are viewed differently.

The issue of how to dispose of unwanted animal health products is a less pressing issue to both industry and farmers, essentially based on its comparatively small unit volume. The farmers interviewed and those in the focus group stated they do not have very much unwanted medication and when they do, it is part of a small bottle. They do not see the remaining product as being much of a threat to the environment compared, for example, to jug of expired pesticides.[28] This is an erroneous view, as it ignores the toxicity of the various products being compared, and ignores their potential conversion following disposal. Nevertheless, farmers generally throw the small amounts of unwanted animal health products and sharps in the garbage or give them back to their retailer or veterinarian.

The predominant feeling expressed in stakeholder interviews about change in the management of unwanted pesticides and animal health products is that it is not a high priority. The crop protection industry has already developed solutions, and they have evolved into a mainstream activity that is working well. For animal health products and sharps both the animal health industry and farmers are willing to discuss and offer ideas on solutions, but neither cite this as a major area of concern to them. Government is interested in exploring alternative solutions to an ongoing problem for the farming community; one that works and is fair for all stakeholders.

[28] Through this study it was found that some farmers believe that the volume of a product represents its ability to harm the environment. Toxicity is affected by the chemical agent, concentration, volume, route of exposure, its half life and inertness and the metabolites to which it breaks down.

4.2.1 CropLife Canada and CleanFARMS™

As mentioned in the introduction, CropLife Canada has been operating collection and disposal programs for unwanted pesticides across Canada for twelve years. Commitment to stewardship is one of CropLife Canada's core values and is supported and funded by their member companies. CropLife Canada led the 2009 collection blitz under the CleanFARMS™ brand.

4.2.2 CAHI

The animal health industry believes that unwanted animal health products need to be dealt with using a science-based perspective with a view that any program must be cost-effective and outcome-based. The industry's view is that farmers should and generally do buy only what meds they require because of the small margins in production agriculture. They believe that limited amounts of unwanted products are sitting in medicine cabinets across rural Ontario. For these reasons, the animal health industry believes that a science-based analysis needs to be conducted so that cost-effective programs that manage identified risk can be considered.

4.2.2.1 The Challenge of Own-Use Importation to the Canadian Animal Health Industry

A significant challenge for the animal health industry is the issue of importation for 'own-use' of animal drugs and the use of active pharmaceutical ingredients. "In a benchmarking survey conducted in 2006 by the International Federation for Animal Health, titled 'Benchmarking the Competitiveness of the Canadian Animal Health Industry' found that unlike other developed countries surveyed, Canadian law permitted the importation and use of non-Canadian licensed product. Canada permits animal owners to import products for their own use and active pharmaceutical ingredients or bulk chemicals are permitted for use by health professionals. This market was estimated to have a value of $100 million, which is actually proportionally to 30 – 40 % of the sale of Canadian licensed drugs."[29] The animal health industry posits that allowing these products into the market has negative competitive consequences to the animal health industry in Canada, including fewer products being brought to the market.

The issue of imported own-use animal drugs and active pharmaceutical ingredients creates significant funding and operational challenges for the development of programs focused on the collection and disposal of unwanted animal health products. Since they are neither the producer nor the first-importer of these products, the Canadian animal health industry cannot be expected to pay for the collection and disposal of these products. However, finding the products in use and collecting fees from the farmers and veterinarians that purchase them is also difficult. Operational 'work-around' solutions are discussed later in the report, but these 'work-around' solutions can add complexity and possibly costs to the administration of programs.

The issue of imported own-use product and active pharmaceutical ingredients is unresolved. As a precondition to implementation of a universal program of collection and disposal of unwanted animal health products that includes cost-sharing with the industry, the government and the Canadian animal health

[29] Presentation by CAHI to the Senate Standing Committee on Agriculture and Forestry, April 10, 2008.

industry should work together to review options and determine an appropriate and viable solution to the disposal question.

4.2.3 OMAFRA and the Ontario Government

Food safety, environment and farm safety are three of several key focus areas for OMAFRA. Safe handling, storage and collection and disposal of unwanted pesticides, animal health products and sharps is required to ensure food produced on Ontario farms is safe, to protect our water supply and to maintain a safe working and living environment for farm staff and farm families. OMAFRA sees proper collection and disposal of agricultural waste as an important issue. However, unwanted pesticides, animal health products and sharps are considered to be relatively small within the context of the industry's overall environmental challenge.

The Ontario government is working to foster a green and sustainable economy. Government has been encouraging and requiring all industries to improve product design, processing, packaging, recycling and end-of-life management for decades. Ontario is committed through several Acts and regulations and by the Canada-Ontario Agreement on Respecting the Great Lakes Basin Ecosystem to protect the water supply for all of the people, species and industries that rely on it. To government it is not the question of *how risky is this issue of unwanted products?* Rather it is a question of *how do you solve this problem properly*? Government sees the environment as a shared responsibility among all those who work, live and play in it because we all benefit from the results.

4.2.4 AGCare and OFAC

AGCare is the voice for Ontario crop producers on environmental issues. Their vision is to enhance the public confidence in the environmental stewardship of Ontario's crop producers. They were instrumental in developing the Grower Pesticide Education Course and have been involved with the obsolete pesticide collection and disposal programs. AGCare is committed to ensuring there is an effective mechanism for farmers to properly dispose of their unwanted pesticides. AGCare's sister organization is the Ontario Farm Animal Council (OFAC). OFAC represents livestock farmers on animal care, environment and food safety issues. OFAC believes that developing a solution for unwanted animal health products and sharps similar to what the crop protection industry has done is the right thing to do for the safety of livestock farms and the environment.

4.2.5 OABA and OVMA

The Ontario Agri-Business Association and the Ontario Veterinary Medical Association represent the interests of grain and feed dealers and crop input suppliers, and the veterinarians in Ontario, respectively. In many cases their members are the ones who sell the pesticides or animal health products and sharps to farmers. The ag retailers have been instrumental in the container recycling program and some retailers have assisted with the obsolete pesticide collection program. Many veterinarians collect and dispose of unwanted medications and sharps as a service to their customers. As representative organizations, OABA and OVMA want to be aware of any solution to this issue that involves their members. That said, neither organization sees collection and disposal of unwanted pesticides, animal health products and sharps as *their issue*.

4.2.6 Municipalities

The AMO clearly states that municipalities are to collect residential waste only, not commercial waste, averring that this is the mandate from the province to the municipalities. Their view is that agriculture is a business and therefore is not to use municipal garbage collection as the means to dispose of agricultural waste. They cite reports indicating that there is only two and a half years worth of space remaining in municipal landfills, and so adding additional waste streams from commercial operations in not an option.

Fourteen municipalities in Ontario and the Association of Municipalities of Ontario (AMO) were interviewed for this study and the results were quite surprising. Chatham-Kent, Middlesex, Haldimand-Norfolk, Wellington, Huron, Bruce, Simcoe, Peterborough, Prince Edward County and the County of Hastings, Region of Waterloo, Peel and Durham Regions, the City of Guelph and the City of Ottawa were contacted about the collection and disposal services offered to resident farmers specifically for unwanted pesticide, animal health products and sharps used on farm.

Half of these municipalities do accept agricultural waste. Each municipality operates a little differently but the municipality and, in some cases, the individual staff person working at the landfill ultimately decides what gets collected and what does not. Some municipalities were clear that agricultural waste was never accepted. Other municipalities stated they do accept agricultural waste, but have certain rules regarding volumes, specific times and farm size. Some municipalities stated that they are not supposed to collect agricultural waste but purposely look the other way.

In one unique example, Chatham-Kent stated they do not collect agricultural waste generally but ran a special waste collection day for farmers in 2005 with the intention of running this type of collection every five years. Chatham-Kent also stated they would be willing to partner with an organization like CropLife Canada to help advertise their collection program and see partnerships with industry as the way of the future.

4.2.7 Veterinarians in Ontario

Farmers primarily purchase animal health medications from their veterinarian. Over-the-counter meds and sharps can also be purchased from many ag retailers. Veterinarians are well suited to participate in the stewardship of animal health products and sharps used on farm because they sell the products, use the products themselves, have established a method to dispose of these products for their clinic, are spread across the province geographically and are in regular contact with farmers.

Starting in 2002, veterinarians were required by the Ministry of the Environment to register with their Hazardous Waste Information Network (HWIN) as a waste generator. Initially the OVMA lobbied against this requirement but when it was determined that an exemption would not be granted, the OVMA began assisting veterinarians with this task and developing a solution to keep costs to a minimum.

Each veterinary practice is required to register annually with HWIN. When medical waste is picked up by a service provider a small fee is charged by HWIN with each manifest. OVMA is working with partners to

establish Operation Safewaste, a service which would simplify the waste collection and reporting process further and negotiate a good rate for waste collection and disposal for veterinarians. Operational Safewaste is planned to start in 2010 and there will be no requirement for veterinarians to use this service. Most veterinary clinics are registering with HWIN and are disposing of their medical waste through a proper channel; however it is possible that a few are not.[30]

Through the producer survey, focus group and interviews with farmers, several farmers stated that they give any unwanted medications and used sharps to their veterinarians as a common practice. In the producer survey, 23% of farmers with livestock stated the veterinarian takes unwanted medications away.[31] The veterinarians that offer this service do so on their own accord to assist their customers. Under the Environmental Protection Act Regulation 347 collecting and transporting hazardous waste that veterinarians themselves did not bring to the farms is prohibited. Six large animal veterinary clinics were contacted for this study. Half of these clinics do accept unwanted animal health products and sharps from their customers and half do not. As an example of the positive view, Tavistock Veterinary Clinic stated they collected the unwanted meds and sharps because it was good customer service, and then questioned, "*What else would our customers do with them?"*

Veterinarians are viewed as respected leaders in agricultural community and could be part of a solution to properly collecting and disposing of unwanted animal health products and sharps used on farm. In some cases veterinarians are already part of the solution. If veterinarians were to become part of a province-wide solution there would be some challenges to overcome, including changing regulations, maintaining biosecurity, dealing with under-serviced areas and determining a funding solution.

4.2.8 Ontario Farmers

Through the in-depth producer interviews, discussions with farmers about the project, the field survey, the focus group and the results of the CleanFARMS™ collection blitz the project team learned a lot about how farmers perceive the issue of unwanted pesticides, animal health products and sharps used on farm. Farmers understand that proper disposal of unwanted pesticides, animal health products and sharps is important. 98% of farmers surveyed agreed or strongly agreed that this was an important part of how they manage their farm.[32]

Farmers are resourceful; they have found various solutions to dispose of these wastes streams and the other agricultural waste they generate. "58.9% of farmers have made changes to how they handle waste in the past 10 years, including reducing the amount of waste they produce, returning pesticide containers and

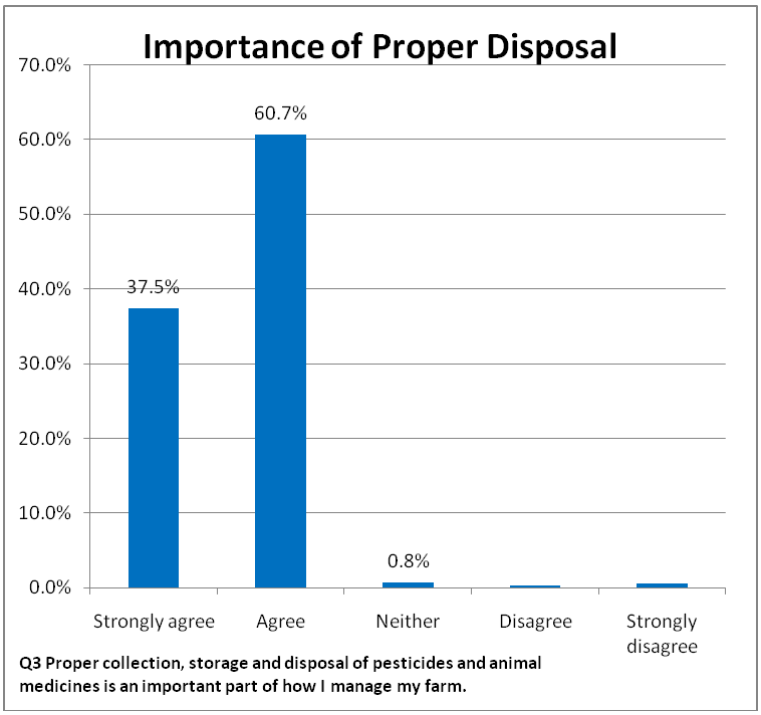
[30] At the 2009 CleanFARMS™ collection there were a number of veterinarians that brought sharps and unwanted animal health products to the collection sites for free disposal. Whether they have not set up a proper disposal method or are just taking advantage of an opportunity to dispose of their waste for free is not known.

[31] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.

[32] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.

improving storage."[33] Farmers are open to taking products to a central location, doing additional work in sorting waste and paying for disposal costs, but are not willing to do more paperwork. Properly dealing with agricultural waste is a big issue to farmers, but unwanted pesticides, animal health products and sharps is a very small part of the issue. Manure, deadstock, bale wrap, used oil and tires are bigger concerns.

A significant amount of field research was completed determining what farmers think about this issue, how they currently behave and their likelihood to change their behaviours regarding the disposal of these waste streams. Here is what we learned.

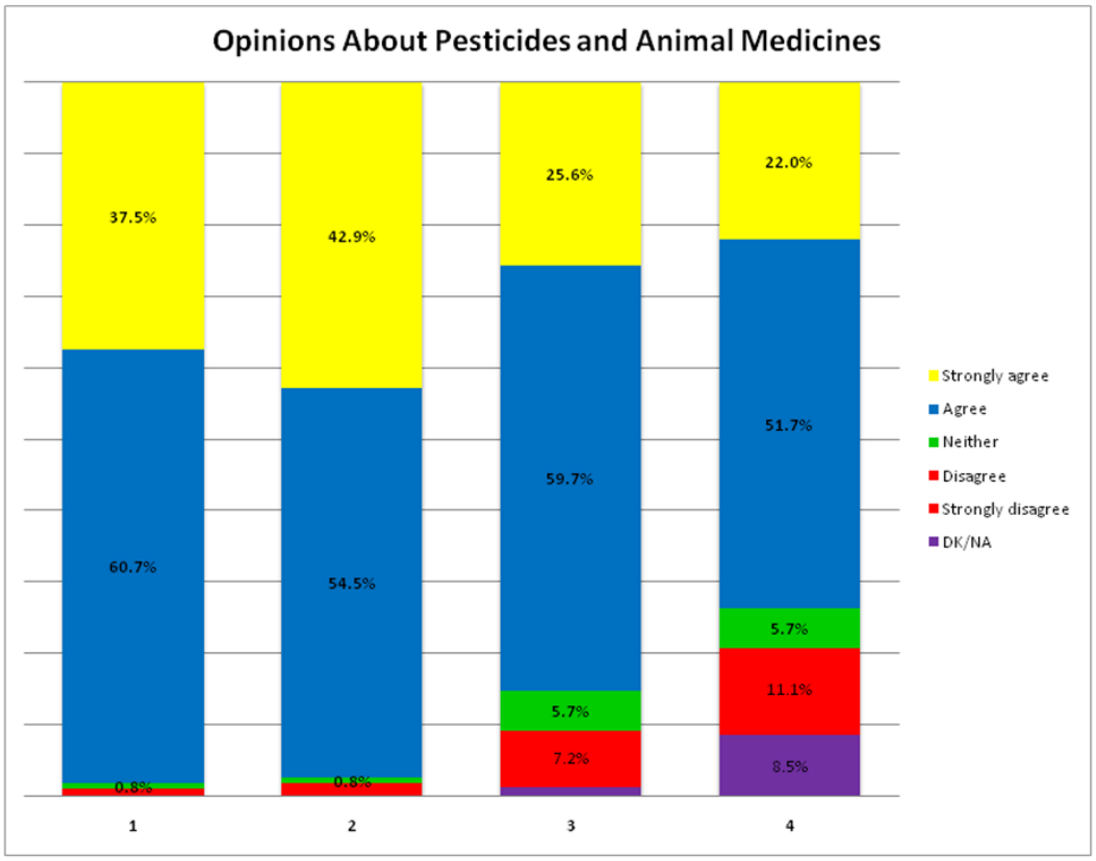


Q3 Proper collection, storage and disposal of pesticides and animal medicines is an important part of how I manage my farm.

Farmers understand that proper disposal of unwanted pesticides, animal health products and sharps is important. 98% of farmers surveyed agreed or strongly agreed that this was an important part of how they manage their farm.[34] Farmers own a good percentage of land in the province and do not want to harm the environment. They know that pesticides can affect water quality. The majority of farmers agreed that animal health products can impact water quality as well, but their position on animal health products affecting water was not as strong as their position about pesticides and water quality.

[33] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.

[34] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.



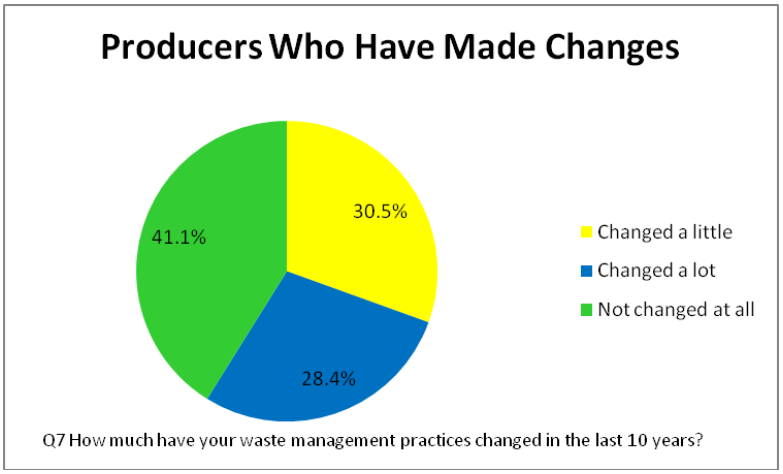
1: Proper collection, storage and disposal of pesticides and animal medicines is an important part of how I manage my farm.
2: Preventing the release of pesticides and/or animal medicines into water resources near my farm is as important as preventing the release of manure, gasoline or excessive sediments.
3: The release of pesticides into the natural environment has an impact on water quality in the Great Lakes.
4: The release of animal medicines into the natural environment has an impact on water quality in the Great Lakes.

Farmers are resourceful. Through the survey, focus group and producer interviews it was also apparent that farmers have resolved the potential problem of their specific waste management needs, in their view, adequately. Farmers use a range of methods to dispose of unwanted pesticides, animal health products and sharps used on farm:

- Give animal health products and needles to their veterinarian or and pharmacy
- Take all three product streams to the CleanFARMS™ collection blitz
- Spray unwanted pesticides on fallow land
- Mix left–over pesticide with a compatible pesticide the following year
- Medicate animals for an extra day to use up remaining product
- Store needles in a sealed, puncture-proof container on farm
- Stored pesticides and animal health products on farm
- Take products to the dump
- Throw unwanted products in with general garbage for municipal collection
- Dispose of the products on farm.

While many of these solutions are or can be fully supportive of a good stewardship approach to farm waste management, some of these practices are directly or potentially unacceptable as safe for the environment and for people on the farm and off. Without a more suitable and convenient replacement, they will continue to be used.

In the producer survey we learned that 59% of farmers have made changes to their waste management practices in the past 10 years. Generally, people who have made changes in the past are more willing to make changes in the future. The survey asked farmers what factors would make them participate if new disposal programs were developed in the future; 92% said they were likely or very likely to participate *to do the right thing.*[35]

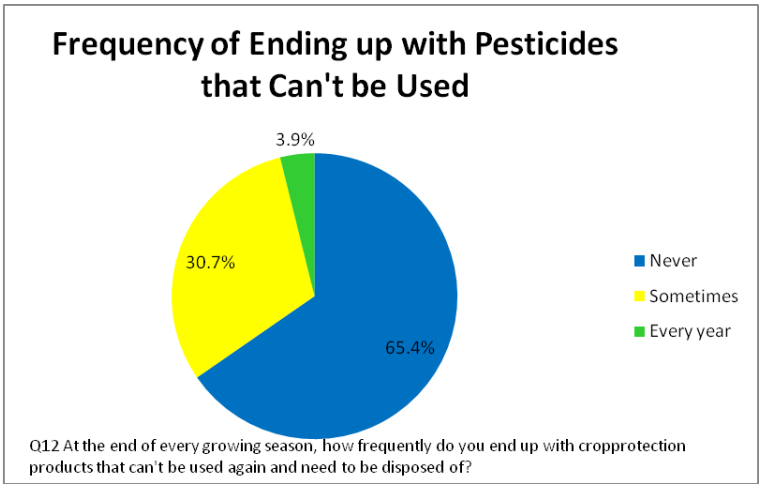


Given all these factors, if provided with acceptable and simple options to dispose of these products, it is reasonable to believe that most Ontario farmers would consider adopting approaches that improve on their current practices.

4.3 Relative Priority

It is not known how much unwanted pesticides, animal health products and sharps are being stored on Ontario farms and how quickly these volumes reoccur. In the producer survey "65% of farmers said they never have crop protection products left over that can't be used and need to be disposed of."[36] Changes in the industry are also reducing the likelihood that farmers will end up with unwanted pesticides because of the greater use of custom spraying, water soluble packaging, additional technology in the seed industry and a shift towards organic farming.

That being said, 35% of farmers do have leftover products. A profile and additional research can be undertaken to determine why these producers have unusable



[35] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.

[36] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.

products and to determine what programs and program elements might be specifically suited to them.

Through the focus group and in interviews with farmers, the project team learned that farmers are not particularly concerned that there is no province-wide collection and disposal program for animal health products and sharps, for three reasons:

- They do not normally have significant amounts of unwanted animal health products and sharps on farm
- The products can be stored relatively safely for years
- Farmers equate the volume of a chemical with its ability to cause harm to the environment.

In a small survey of six farmers representing the dairy, beef, lamb, hog, broiler and turkey sectors, the farmers stated that they end up with little-to-no expired meds each year. The farmers in the focus group confirmed this result. The farmers in the focus group also stated that "if you store the products properly (according to the instructions in the Grower Pesticide Safety Course and the Livestock Medicines Education Program), then safety is less of a concern."

Through the focus group discussion it was noted that the farmers equated the volume of a product with its ability to harm the environment. Farmers understand that dumping a jug of concentrated pesticide will affect the water quality and can cause harm. Farmers in the focus group related that animal health products are used in such small volumes compared to pesticides, and therefore did not seem concerned that disposing of an expired bottle of medicine occasionally could or would cause harm to the environment. The belief that the volume of a product relates to its ability to harm the environment is directionally true but can lead to an incorrect conclusion. Toxicity, which is the truer measure of potential harm, is affected by other factors such as the chemical agent, concentration, volume, route of exposure, its half life and inertness and the metabolites to which it breaks down.

Regarding sharps, the farmers interviewed collect used sharps in a puncture-proof container such as a coffee can. Depending on the farm type and size it can take quite a while for the coffee can to be filled and when it is full, it does not take up any appreciable amount of space. The farmers dispose of the cans of sharps through various means; giving them to their veterinarian, taking them to their pharmacy, putting them in with their household garbage. Again it is the small volume of sharps that contributes to the farmer's lack of concern over not having an ongoing collection and disposal program.

In 2009 the CleanFARMS™ collection blitz was held at sixteen locations across Ontario. Over 520 farmers brought unwanted products to the collection sites. 77 boxes of sharps, 86 boxes and 4 totes of animal health products were collected and sent for proper disposal.[37] For pesticides approximately 116,000 kg of

[37] At the time this report was finalized the actual weights of animal health products are sharps collected in the 2009 CleanFARMS blitz was not available.

unwanted pesticides were collected and disposed of.[38] The feedback from the farmers was all positive: thanking the industry for the service and wishing that the collections occurred more often.

Should a collection and disposal program be established and operated if the farmers interviewed and in the focus group didn't seem overly concerned about having an ongoing program? The answer is yes. Here is why:

- Farmers care about the environment, want to do the right thing and will do the right thing when the opportunity is available
- In the 2009 blitz, 520 farmers participated in the blitz and large volumes of unwanted pesticides, animal health products and sharps were removed from farms across Ontario and safely disposed of
- 35% of farmers surveyed stated they sometimes or always have remaining product that cannot be used and that product needs to be disposed of properly[39]
- The 502 farmers that did participate and were pleased with the program and can be helpful in communicating the benefits of the program to other farmers to help establish a positive community norm around safe disposal.

[38] Unofficial results from 2009 CleanFARMS™ collection.

[39] It is not known exactly why the 35% of farmers interviewed sometimes have remaining product. There are other tactics such as, education that should also be employed to reduce the frequency and amount of product becoming unwanted.

5 Analysis

The research, analysis and evaluation of the options was an iterative exercise over the course of the project. Some of the original options were found not to meet the needs of the project while others held pieces of a solution. These partial solutions have been included as part of the final recommendations. Mid-way through the feasibility study, options that did not meet the established criteria were set aside and more focus attended to the stronger solutions. The collection blitz and return depot concepts were seen to be good solutions from the outset as they have been successfully used or piloted in Ontario. Through the stages of the analysis these two models continually met the evaluation criteria.

5.1 First Iteration

In the first iteration four options were either eliminated or acknowledged as a piece of the solution but neither a complete solution nor a platform from which to build a complete solution.

Options	Criteria Not Met	Piece of the Solution?
Go Organic	Does not meet the stated needs of the project	A natural shift to organic production will over time reduce the amount of product needed to be disposed of.
On-Farm Disposal	Does not meet the stated needs of the project	Recognized and acceptable on-farm disposal options will be considered as part of the solution and farmers should be encouraged to follow them.
Mobile Farm Supply On-Farm Pick-up	Operational simplicity	Not part of the solution.
BUD Method	Does not meet the stated needs of the project	Educational component that should be part of the "best solution(s)" to help reduce the amount of waste generated.

5.1.1 Go Organic

Organic farming limits or eliminates the use of many synthetic pesticides and animal health products. Therefore, as an option to conventional farming, it represents a direction to be considered. As organic farming continues to grow and gain market share, the amount of unwanted pesticides and animal health products generated will be reduced.[40] However, market forces are not sufficient to mandate a complete shift to organic production. A meaningful program to collect and dispose of these unwanted products needs to be consistent with mainstream agricultural practices which currently and for the foreseeable future include the beneficial use of veterinary medicines and pesticides for livestock and crop production.

[40] Potentially an initial increase of unwanted products could occur as farmer's transition from conventional practices to organic.

5.1.2 On-Farm Disposal

There are good on-farm disposal options for pesticides that are considered acceptable to the industry including:

- Apply registered pesticides at the label rate or less to fallow land
- Apply registered pesticides to a label crop following the label guidelines
- Store remaining pesticides properly and use in another growing season.

These practices work well for using or disposing of small amounts of unwanted regulated pesticide. They do not resolve all of the pesticide, animal health product and sharps waste that is generated.[41] These practices do not provide enough of a net gain for on-farm disposal to be considered as "the solution" for collection and disposal of pesticides, animal health products and sharps.

The province of Ontario allows the on-farm burial of many agricultural wastes, which could include wastes generated by the use of pesticides, pharmaceuticals or sharps. However, it was accepted by the steering committee that this didn't appear to be a responsible or environmentally-acceptable disposal option for the wastes being considered in this report.

Further, building a waste management program exclusively on on-farm disposal might risk apparent acceptance of other unsafe disposal practices including illegal dumping, improper burying or burning these product streams. However, one of the tenets of community-based social marketing is to establish community norms around sustainable practices. Therefore acknowledging the continuation of the acceptable on-farm disposal practices should become part of the final, more complete solution.

5.1.3 Mobile Farm Supply Pick-up

A mobile farm supply on-farm pick-up mimics the back-haul concept in the trucking industry. A truck that can deliver a load and then reload for the ride home will increase its business efficiency. There are several service providers that visit farms regularly that could be considered as potential providers of a waste collection service for unwanted pesticides, animal health products and sharps (e.g. DACO). The mobile farm supply company would look to profit from this service financially or at minimum through goodwill from supporting their customer's environmental initiatives.

The product streams being collected do carry a certain level of risk. Transportation of dangerous goods is a serious consideration so the mobile farm supply company would need a specifically-designed truck to meet the MOE standards. Determining the requirements and designing a truck to carry both dangerous goods and potentially animal feed would be a fairly significant hurdle.

A business case would need to be developed to determine what the potential profits of this service would be after fulfilling the licensing requirements and making the modifications to the truck, yard and processes. For

[41] It is not know whether there are any acceptable practices to dispose of animal health products on farm.

the small amount of unwanted pesticides, animal health products and sharps waste generated on farm each year it is difficult to imagine a successful business case for offering this service.

Food safety is a very important issue to farmers, the agriculture industry and society. The negative perceptions of a feed company (or other input supplier) using the same truck to collect agricultural waste and deliver feed (or other products) for food animals would be a difficult challenge to overcome, and may neutralize any positive public relations or goodwill the farm supply company was hoping to create. The weight of these logistical challenges compared to the potential net gains for the service provider was felt to be too significant. As well, after the producer survey was completed, the results showed that farmers are quite willing to take these products to a central location, and so an on-farm collection option was seen as less imperative.

5.1.4 BUD Method

If every consumer bought only what they needed and used it as planned, there would be significantly less waste generated. The waste that is generated should be disposed of properly. BUD is seen as a good practice but cannot resolve the issue completely. BUD as an educational component should become part of the final, more complete solution.

5.2 Second Iteration

Following an evaluation session with the steering committee a number of options were consolidated and the additional criteria of frequency, location and cost were considered. Additional research was carried out and the results from the field survey were completed. Through analysis and evaluation six of the remaining options were considered. Four were found to be partial options or options that contributed to other solution sets. Two were eliminated as not meeting the established criteria.

Options	Criteria Not Met	Piece of the Solution?
Bookmobile	Frequency and cost	Not part of the solution(s).
Provincial Sweep	Frequency	Could be used if there were a major change in legislation or policy or new research strong enough to require a product recall.
Toxic Taxi	Cost	Service is available in Region of Sudbury and potentially other municipalities.
Return to Veterinarian	-	Some veterinarians collect unwanted medications and used sharps from their customers.
Private Collection and Disposal	-	This service is currently available to farmers.
Municipal Disposal	-	This option is available to farmers in some municipalities.

5.2.1 Bookmobile

The bookmobile concept was originally considered because it could operate with a more regular frequency (e.g. every four weeks) and that the collection site was the hazardous waste truck itself rather than a depot. The variables that help determine the frequency required for the collection and disposal of unwanted pesticides, animal health products and sharps are:

- The volume of product
- The rate of reoccurrence
- The rate of decomposition
- The dangers of the products to people, animals and the environment.

Although it is not known exactly how much pesticide, animal health products and sharps are stored on farm, indications from the producer interviews and the field survey illustrate that the volumes are not high and they do not reoccur quickly.[42] Unlike household garbage, deadstock and manure, the waste streams in this study do not start to decompose quickly. Modern pesticides and animal health products can be stored in their original containers for years without concern. If the products are stored properly (i.e. in the original containers in a locked storage area) the products are not a major cause for concern.

The bookmobile model was differentiated from the other models by its regular frequency. Based on the above analysis, it was determined that although the bookmobile model could be achieved from a logistical standpoint, the industry simply does not require a service frequency that would be enabled by this approach.

In addition, it became evident that the cost to have a hazardous waste truck and a driver parked in one location for an entire work day would be too costly for the results achieved.

5.2.2 Provincial Sweep

The objective of the provincial sweep is to “sweep the province clean” of a particular product to prevent harm (e.g. gun collections, product recalls, refrigerator round-up). The need for a provincial sweep could be generated through:

- New legislation (e.g. banning the use of pesticides for agricultural production)
- A policy change (e.g. governments as of 2014 will no longer fund collection blitzes)
- New important safety information (e.g. product X is poisoning bald eagles).

As stated earlier, pesticides, animal health products and sharps can be stored on-farm for years with little concern as long as they are stored properly. And none of the conditions supporting this approach exist

[42] In the awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009, 65.4% of producers stated they never have crop protection products remaining at the end of the year that can’t be used and need to be disposed of.

currently, nor are they anticipated in the foreseeable future, and so there is not a reason to consider a provincial sweep.

5.2.3 Toxic Taxi

A toxic taxi service operates a dispatch and collection service for hazardous waste products. Farmers who have unwanted pesticides, animal health products and sharps could contact the toxic taxi and the toxic taxi would pick up the products on-farm. The service is known to be currently available to residents in the Sudbury Region and in the City of Toronto.

One challenge presented by this model as a province-wide solution is its cost. Discussions with the City of Toronto and the Region of Greater Sudbury revealed that operating a toxic taxi is expensive on a cost-per-unit-collected basis. It is possible that agriculture may be able to piggy-back on municipalities that offer this service. Also, in certain geographic regions multiple industries (e.g. forestry, mining and agriculture in Northern Ontario) could partner together to try to make this service cost-effective.

One of the differentiating factors of this model, and an early consideration in its use, is that it is an on-farm pick-up model. In community based social marketing it is important to determine and minimize the impact of the barriers to the desired behaviour. It was thought early on in the study that taking products to a central location might be seen by farmers to be a barrier to their participation. Therefore, we included this possibility in the producer survey. The results were that "63% of farmers stated that taking products to a central location was not a barrier to participation."[43] Further, farmers in the focus group recommended that collections should be held at places they already frequent (e.g. ag retailer).

Therefore, as long as the central locations are within a reasonable distance and are held at locations farmers frequent, then farmers will be willing to drive the products to the central location and an on-farm pick-up model is not required. To further confirm this belief, farmers have demonstrated their willingness to consistently return pesticide containers to their retailers – a very similar activity.

5.2.4 Return to the Veterinarian

According to the producer survey 23.1% of farmers who have livestock give their unwanted medications and sharps to their veterinarian. This is a customer service these veterinarians are providing to their customers and farmers should be appreciative of this service where available.

Because of the similarities of the original point-of-purchase return depot options and a province-wide return-to-veterinarian option, the two options were combined after the initial evaluation session to become the return depot option, in which interested veterinarians, ag retailers and other ag service providers could be involved.

[43] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.

5.2.5 Private Collection

Contacting a private waste management service is always an option to farmers. Farmers who have acquired a large volume (e.g. inherited unwanted products) or who operate farms that generate large volumes of waste could find this service useful. Three participants in the project's focus group use this solution regularly, at their own expense, and see it as a logical solution to a combined waste-disposal need. One question about private service is whether the products collected are properly sorted and channelled into the different waste, recycling and resource recovery streams. Farmers who have small amounts of unwanted products may find the service cost-prohibitive.

5.2.6 Municipal Disposal

This option was considered because municipalities already deal with waste collection and disposal. Many municipalities offer curbside garbage, recycling and organic waste collection even in rural areas. Many municipalities also offer hazardous waste collection services and dump services for larger residential items (e.g. building material waste). Farmers are residents of municipalities and are familiar with their services. The project team interviewed 14 municipalities and found that half would accept unwanted pesticides, animal health products and sharps, as noted earlier.

This option is not a candidate as the province-wide solution. Municipalities set their own guidelines about what waste streams they will collect and from whom. Hundreds of municipalities in Ontario would need to be brought onside. Municipalities may not want to collect these waste streams for quite legitimate reasons that cannot be easily overcome (e.g. do not have enough landfill space, do not have the budget, etc.).

However, this option can be part of the overall solution. Farmers who live in municipalities that accept these waste streams should be encouraged to use this option if they accumulate unwanted products. Municipalities could also work in partnership with agriculture locally to support any waste management initiatives being held.

5.3 Third Iteration

After confirming the options that held potential pieces to the overall solution and confirming the options that did not contribute to the solution, focus shifted to the remaining two options: the collection blitz and the return depot to confirm the feasibility of these options and determine the operational details and strategic considerations.

Options	Details	Product Streams
Collection Blitz	Farmers take accepted product streams to a central blitz location. Blitzes are run by the industry approx every 4 years at 15-20 sites across the province	• Pesticides • Animal health products and sharps • All 3 streams
Network of Return Depots	A network of return depots are established at ag service providers across	• Animal health products and sharps

	the province. Farmers take unwanted products to the depots during regular business hours	• Sharps

5.3.1 Collection Blitz

Collection blitzes for pesticides have successfully been held three times in Ontario since 2001. In 2008, AGCare led a pilot collection blitz for animal health products and sharps. In the 2009 CleanFARMS™ blitz pesticides, animal health products and sharps were collected. CropLife Canada, CleanFARMS™ and AGCare have demonstrated that this option works. In the 2009 collection 77 boxes of sharps, 86 boxes of animal health products, 4 totes of animal health products and 116,000kg of pesticides were collected and disposed of.

Government, industry and farmers support this initiative. No significant barriers were identified in the producer survey that impair this option. The frequency of blitzes can be changed, if it was felt that the current blitz frequency was not meeting the needs of the industry. Collection blitzes work in Ontario as a province-wide model to collect unwanted pesticides, animal health products and sharps.

5.3.2 Network of Return Depots

A small network of return depots for unwanted animal health products and sharps was piloted in Eastern Ontario at ag retailer locations from 2000 to 2005. From an operational stand-point this option can be carried out as a province-wide solution for animal health products and sharps.[44] Potential depot sites could include ag retailers, veterinarians, ag colleges, pharmacies or local municipal buildings as examples. The return depot could accept products year-round, making it very convenient for farmers to use. The number of return depot locations would be determined based on the goals of the project, considering drive times for farmers and the costs to operate a depot. The program could be designed to minimize the barriers to participation. The cost of the program is reasonably relative to the issue size and will be reviewed in the financial section.

5.4 Conclusions from the Analysis

There are two options from which a provincial model for the collection and disposal of unwanted animal health products and sharps can be built and one model for pesticide collection and disposal. Supporting these province-wide solutions is a menu of partial solutions that will contribute to the overall solution for unwanted pesticides, animal health products and sharps used on farm.

[44] A return depot concept cannot be used for pesticides as it is illegal for ag retailers to have unregulated or deregistered pesticides onsite.

6 Recommended Solutions

The Collection and Disposal of Unwanted Agricultural Pesticides and Pharmaceuticals in the Great Lakes Basin Project required the successful proponent to "research and develop best options to move all farms in Ontario to operate within a system of responsible, sustainable and transparent management of crop pesticides and livestock medical (pharmaceutical) wastes."[45] The following sections outline the best solutions – a combined stream collection blitz and / or a network of return depots, both solutions supported by the partial solutions noted earlier in the report.

6.1 Combined Stream Collection Blitz Program

A combined stream collection blitz collects unwanted pesticides, animal health products and sharps. A series of blitz locations are established across the province covering the agricultural areas. Farmers bring their unwanted products to the collection sites where they are collected and packaged for transportation to a proper disposal site. The blitzes are held according to the required frequency to meet the program goals and objectives. The cost to operate a blitz are determined and managed by the lead organization. The funding to support the blitz can come through industry levies, government grants, user-pay and in-kind support.

The overall goal is for farmers to properly dispose of unwanted pesticides, animal health products and sharps so that these products are not released into the environment where they could potentially cause harm. Therefore the partial solutions (e.g. acceptable on-farm disposal practices, returning products to veterinarians, using municipal services, etc.) will be encouraged and can provide support to the blitz concept both during operation and in between collection blitzes.

6.1.1 Frequency

As mentioned earlier, the amount of unwanted product on farms across Ontario is not known. However, we do know that the volume of unwanted products does not accumulate or reoccur quickly. We have also concluded that over time, the amount of unwanted product generated will shrink. The livestock farmers interviewed stated they rarely have expired medications and when they do it is in small amounts. 65% of farmers surveyed say they never have pesticides left over, and the use of custom spraying, water-soluble packaging and increased technology in the seed are reducing the opportunities for farmers to have remaining pesticides at the end of a growing season. Farmers are required to store their pesticides, animal health products and sharps properly and if a container of product becomes unwanted it can still be stored safely on farm with minimal risk to people, animals or the environment. So how frequently should a collection blitz be held?

To answer this question, the goals of the stakeholders need to be determined. If, for example, the goal were to sweep the province clean of all unwanted pesticides, animal health products and sharps by 2012, the

[45] Feasibility Study Terms of Reference – Collection and Disposal of Unwanted Agricultural Pesticides and Pharmaceuticals in the Great Lakes Basin Project.

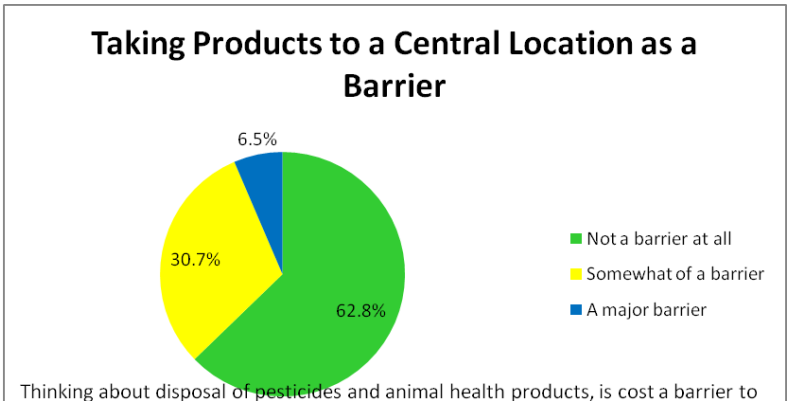
frequency of the blitzes would increase dramatically. Or if the goal were to remove a specified amount of these products from Ontario farms within a certain time period, then a frequency could be calculated by determining the average amount collected in the last three blitzes and determining how many blitzes would be required to achieve that result.

However, if the goal is to provide Ontario farmers with a low-cost option to dispose of unwanted pesticides, animal health products and sharps that have accumulated on farm over time, then every four years is likely a reasonable frequency, based on what we know about how quickly the volumes reoccur and knowing that safe storage is a suitable option. The variable of frequency can be changed if the goals of stakeholders or needs of the industry change. Increasing or decreasing the frequency variable will directly impact the cost operating the program and the amount of unwanted product safely removed from the environment.[46]

CropLife Canada / CleanFARMS™ have been operating blitzes across Canada in each province every four years with government funding at 50%. The levy charged to the manufacturers generates enough revenue to hold a collection blitz in each province every four years. As well, new products come to market every four to five years on average, and so if a product becomes de-regulated or farmers choose not to use what they have in storage, it should not be too long before a collection blitz will be held. On the other hand, several of the farmers who participated in the 2009 blitz commented on the blitz survey that they wished the collections occurred more often. This commentary might have its source in not knowing that earlier blitzes had been held, or that they had been missed by the respondents in these cases, and while increased service may be appreciated by farmers, they may not actually need the service more regularly or want to bear the expense.

6.1.2 Location

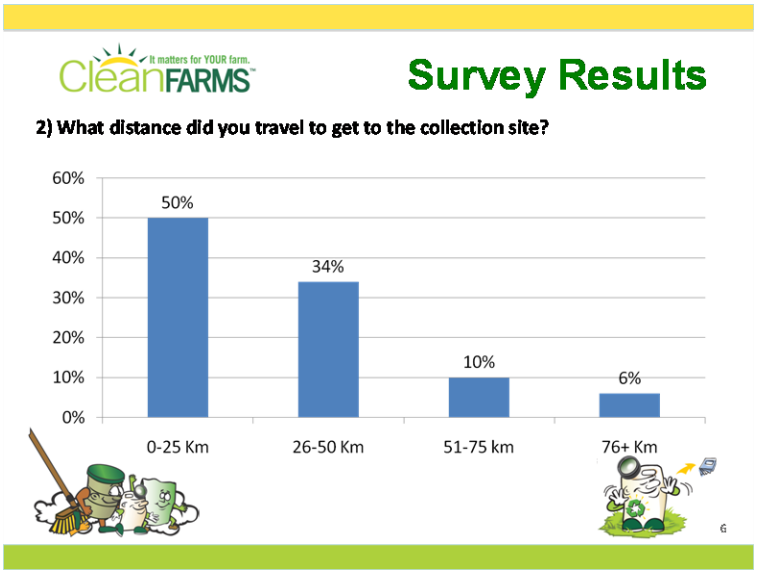
Blitz locations need to be geographically spread to service the agricultural regions of the province as equitably as possible. CropLife Canada / CleanFARMS™ has used between 15 and 20 blitz sites, each site located approximately 100 km apart. This means that the majority of farmers need to travel up to 50 km each way to participate in the blitz. In the producer survey only "6.5% of farmers saw taking products to a central location as a significant barrier."[47] In further investigation, farmers in the focus



[46] Increasing the number of blitz sites will not proportionally increase the amount of product returned. Sites in geographically remote areas do not bring in the same volume of product as an agriculturally dense area.

[47] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.

group had differing opinions on how far they would be willing to drive, their general response being that they will drive to town or drive to their ag retailer for this purpose. In a Cornell study on recycling ag plastics, farmers in New Jersey will travel 45 minutes to deliver ag plastics for recycling.[48]



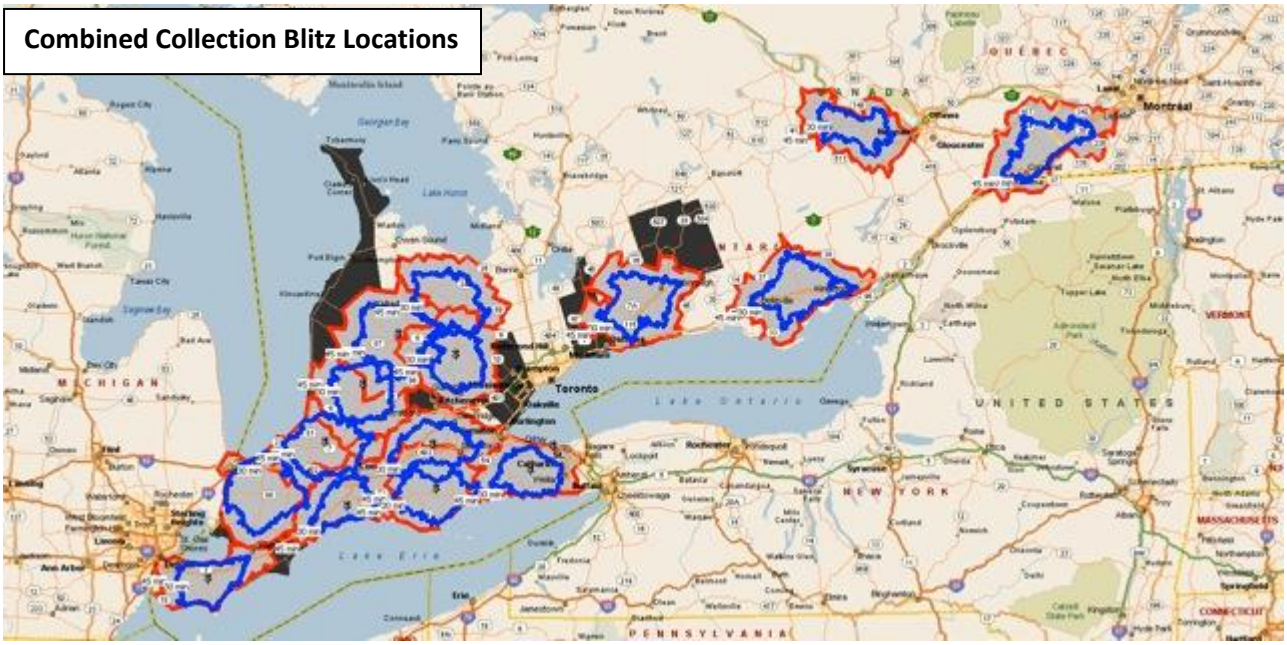
In the 2009 CleanFARMS™ blitz 50% of participants stated they drove less than 25 km one way and 33.6% of participants said they drove between 26 and 50 km one way to deliver unwanted products to the collection site. Only 49 participants drove greater than 76 km each way to participate in the collection blitz.[49] Based on these results it is reasonable to assume that if the sites are geographically spread so the majority of farmer can drive to a site within 50 km or approximately thirty minutes or forty minutes driving time, it will not be a barrier to participation.

In order to investigate this factor, and to determine both how many sites would be optimal and where they would be located, the project team initiated a task to identify collection sites within the more intensive agriculture areas of the province such that a majority of farmers would be required to drive no more that 30 to 45 minutes each way. The map below illustrates the areas of the province that are covered within a 30 minute drive time (blue line) and a 45 minute drive time (red line) one-way, if the collection sites are located in the geocentre of the areas circumscribed. The exercise resulted in the identification of 18 to 20 regions within which a blitz would be operated – 11 in South-Western Ontario, up to 6 in Central-Eastern Ontario and up to 4 in northern Ontario.

[48] Recycling Agricultural Plastics in New York State by Lois Levitan and Ana Barros, Environmental Risk Analysis Program Cornell University 2003 p9.

[49] CleanFARMS™ 2009 Collection Blitz participant survey results.

Combined Collection Blitz Locations



* The black areas of the map are municipalities that stated they accept these product streams (potentially with conditions on amounts, timing, etc).

Based on this number of sites and site locations, farmers living in more remote agricultural areas would incur longer drive times. Partnering with municipalities that are willing to accept these product streams in the more remote areas could be a way for the industry, with support from the partnering municipalities, to efficiently cover more areas of the province. For example, rather than holding a collection site in the Bruce Peninsula, farmers in the more geographically remote areas of Bruce County could be encouraged to use their municipal landfill instead of driving the longer distance to the collection site.

This map shows a reasonable spread of collection sites for Ontario (Northern Ontario not shown). To improve the service for farmers the project team would recommend adding one more site in Eastern Ontario, taking into consideration French language considerations, one site in Elmvale (north of Barrie), one site in New Liskeard, Verner, Thunder Bay and potentially one more additional site between Thunder Bay and Kenora. With 20 or 21 sites across Ontario and potentially partnering with municipalities in the gap areas, the collection blitz concept would provide equitable coverage for Ontario farmers.

6.1.3 Producer Behaviour

In the producer survey "85% of farmers agreed or strongly agreed that the release of pesticides into the natural environment has an impact on water quality in the Great Lakes. 74% of farmers agreed or strongly agreed that the release of animal medicines into the natural environment has an impact on water quality in the Great Lakes."[50] These relatively high levels of agreement indicate a good level of knowledge,

[50] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.

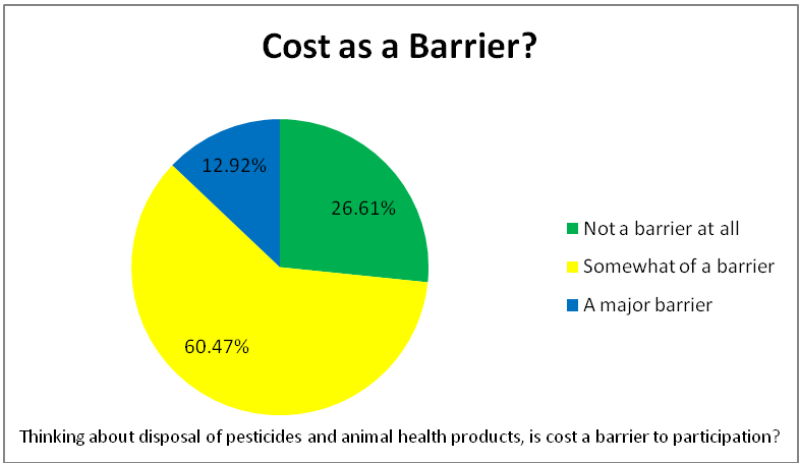
understanding or belief about these factors, and therefore potentially minimal resistance to the acceptance of good practices.?

According to McKenzie-Mohr, to foster sustainable behaviour it is important to identify the barriers to the behaviour change. Farmers clearly stated in the in-depth interviews and the field survey that they were willing to, "do some additional work in sorting the products and willing to take the products to a central location, but not willing to do more paperwork."[51] A collection blitz does not require any significant amount of paperwork for farmers to complete. The lead organizers need to keep this barrier in mind when considering any operational plans that could change this requirement.

As described above, taking products to a central location was not a significant barrier but there is a certain distance that does become a barrier to farmers. Based on what we have learned, a one-way drive time of 30-40 minutes is acceptable but time / distances that are greater will result in fewer participants.

The timing of the blitz is also an interesting variable. The 2009 CleanFARMS™ blitz was held in October and for 520 farmers that worked well. Would more farmers have participated in January, March or August? It is speculative to guess at the best time for a collection blitz as there would be as many opinions on when farmers would want to go to a collection blitz as there are days in the year. It is recommended that the lead organization(s) complete a random quantitative survey on this variable to determine the optimum time to encourage farmer participation.

A surprising result found in the in-depth producer interviews and the producer survey is the willingness for farmers to pay for the disposal of these products. "Farmers understand that whether it is higher product costs, higher taxes or other fees, they will be paying for disposal."[52] In the producer survey only 13% of farmers saw this as a major barrier. This does not infer that any price will be accepted. Farmers will determine how much this service is worth compared to the alternatives.



[51] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey and in-depth producer interviews by Strategic Research Associates, 2009.

[52] Awareness and opinions on the collection and disposal of pesticides and animal medicines – in-depth interview analysis, Strategic Research Associates 2009.

The crop protection manufacturers pay a levy to CropLife Canada which becomes part of the product price. The animal health industry does not yet have an established method to do this.

6.1.4 Costs

Based on information from CropLife Canada, it costs approximately $250,000 to operate a collection blitz across Ontario. Approximately 85% of this cost is the actual destruction and 15% is the cost of supplies, advertising, administration, training, etc. Not included in this proportion is the significant amount of in-kind time donated by the supporting organizations and the industry volunteers.

Adding the animal health product and sharps waste streams to the 2009 collection blitz did not increase the program costs significantly. The cost to collect and dispose of all the animal health products and sharps collected was $19,000. The amount of unwanted livestock medicines and sharps to be collected during blitzes is not known, based on this and the single earlier pilot event. Volume in these quantities would not appear to warrant operating a separate collection blitz for these two streams.

In the table overleaf, total and unit costs for the operation of nine of the program options are detailed in a pro-forma analysis. The costs of the single-stream pesticide blitz have been sourced from but modified slightly from the most recent CleanFARMS™ blitz, in order to make them fully sustainable. Animal health products and sharps options are detailed in similar format, also, with the addition of one significant cost – an estimated $75,000 annual expense to modify the currently-voluntary user program to a required program akin to the pesticide-applicator program. This expense drives a considerable although temporary increase in the unit cost of any option dealing with animal health products and sharps.

Combining the three streams together has several efficiencies and considerable logic, given the findings in the study. However, if a separate program were considered instead of the combination, or in part as an extension, the return depot option for animal health products and sharps is a more efficient vehicle than the separate blitz approach for these product streams.

For the three provincial blitzes that CropLife Canada / CleanFARMS™ has organized in Ontario, CropLife Canada has paid for 50% of the cost of the blitz and has solicited government to cover the other half of the program. CleanFARMS™ pays for the program through the CropLife Canada levy that is charged to the manufacturers of pesticides, who pass the cost through to farmers in the purchase price of the products.

The cost of the levy varies from year to year with the 10 year average being 3.2 cents per package sold into the Canadian marketplace. The amount fluctuates yearly based on the budget needed to operate the collection program.[53] Farmers have been willingly paying this fee for years without issue. Farmers have not had to pay a disposal fee when participating in the collection blitzes because they have essentially paid for this service up front when they purchased the product and because government assists with funding 50% of

[53] It is more costly to run a CropLife collection in Saskatchewan compared to the Atlantic Provinces so the levy fluctuates each year.

the costs. For a combined stream blitz to be the province-wide solution, the manufacturers of animal medicines and sharps would need to consider how to fund the program.

The Canadian animal health industry does not currently have a system in place to fund the disposal of unwanted animal health products. Adding a levy to the product price would be difficult for the animal health industry because there are strict federal regulations regarding the way that patented products are priced in Canada. If it is not possible to work around this issue, an alternative funding solution would need to be found. The industry could still be involved by leading the program and implement a user-pay concept. A modified user-pay concept is in effect in New Zealand with their Agrecovery program for livestock medicines.

6.1.4.1 Pro-forma Costs of Operation – Per Site Basis

AgCare Pesticides, Pharmaceuticals and Sharps

Pro-forma Costs of Operation - Per Site Basis

Cost Centre and Detail	Single Stream Blitz Pesticides	Single Stream Blitz Pharma	Single Stream Blitz Sharps	Combined Stream Blitz - 3 Streams	Combined Stream Blitz - Pharma and Sharps	Return Depot - Pharma and Sharps Year 1	Return Depot - Pharma and Sharps Year 2	Bookmobile - 3 Streams (Monthly)	Toxic Taxi (On-call)
Overhead Costs - Program:									
Leadership and Administration	33,600	18,750	18,750	41,250	26,250	41,250	22,500	47,250	29,850
Communications and Promotion	40,000	40,000	40,000	60,000	60,000	15,000	15,000	20,000	20,000
Training and Education	0	75,000	0	75,000	75,000	75,000	75,000	75,000	75,000
Facility and Equipment Exp.	6,720	3,750	3,750	8,250	5,250	8,250	4,500	9,450	5,970
Travel and Related Expenses	3,360	1,875	1,875	4,125	2,625	4,125	2,250	4,725	2,985
Subtotal	*83,680*	*139,375*	*64,375*	*188,625*	*169,125*	*143,625*	*119,250*	*156,425*	*133,805*
Overhead Costs - On-Site:									
Collection and Admin Staff									53,750
Facility and Equipment									10,000
Travel and Related Expenses									60,000
Other									10,000
Subtotal	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*133,750*
Total Overhead Costs	**83,680**	**139,375**	**64,375**	**188,625**	**169,125**	**143,625**	**119,250**	**156,425**	**267,555**
Variable Costs (per site):									
Local advertising/promotion	250	250	250	250	250	100	100		
Signage and materials	250	250	250	250	250	100	100		
Safety equipment	100	100	100	100	100	100	100	100	100
Transportation	0	0	0	0	0	0	0	24,000	0
Disposal	12,000	1,237	1,237	13,237	1,237	325	325	63,750	63,750
Licenses	65	65	65	65	65	65	65	65	65
Provision for expenses	100	100	100	100	100	0	0	100	100
Other	0	0	0	0	0	0	0	0	0
Total Variable Costs	**12,765**	**2,002**	**2,002**	**14,002**	**2,002**	**690**	**690**	**88,015**	**64,015**
Total Costs - Site Count Options									
Fifteen Sites	275,155	169,405	94,405	398,655	199,155	153,975	129,600	1,476,650	1,227,780
Twenty Sites	**338,980**	**179,415**	**104,415**	**468,665**	**209,165**	**157,425**	**133,050**	**1,916,725**	**1,547,855**
Forty Sites	594,280	219,456	144,456	748,705	249,206	171,225	146,850	3,677,025	2,828,155

6.1.4.2 Assumptions and Rationale for the Pro-forma Cost Estimates

Cost Centre and Detail	Assumptions
Overhead Costs - Program:	
Leadership and Administration	% of $75,000 full time equivalent (FTE) for leadership role. % of $45,000 FTE for administration role.
Communications and Promotion	Assumed $40,000 for a single stream blitz and adjusted up or down for other options based on expected need.
Training and Education	$75,000 for options that collect AH products. Funds go to the cost of making the Livestock Med Education Program a mandatory program.
Facility and Equipment Exp.	20% of staff costs to account for office space and equipment.
Travel and Related Expenses	10% of staff costs to account for required travel and expenses.
Subtotal	
Overhead Costs - On-Site:	
Collection and Admin Staff	25% of FTE for dispatch and driver roles for toxic taxi only.
Facility and Equipment	Dispatch centre space and vehicle costs for toxic taxi only.
Travel and Related Expenses	$0.75 / km X 80,000km for toxic taxi only.
Other	Estimated amount for unplanned events.
Subtotal	
Total Overhead Costs	
Variable Costs (per site):	
Local advertising/promotion	Assumed $250 for each site for the single stream blitz and adjusted up or down for other options based on need.
Signage and materials	Assumed $250 for each site for the single stream blitz and adjusted up or down for other options based on need.
Safety equipment	Minimal amount to purchase safety items such as gloves, safety glasses, coveralls etc.
Transportation	For the bookmobile model only $250 / hr x 8hr/day x 12 sites per month
Disposal	Budgeted costs / site for 2009 blitz & Stericycle costs for return depot pick ups. $12,000 for pest, $1237 for AH & sharps, $60 / pharma pail.
Licenses	HWIN charge of $65
Provision for expenses	Provisional amount of $100
Total Variable Costs	

6.1.5 Branding

CropLife Canada, CleanFARMS™, all the pesticide manufacturers, AGCare, ag retailers, government and volunteers from the industry work hard to organize and operate collection blitzes. In the 2009 blitz, this also included support from the livestock medicines side as well. More could be done to raise awareness of the collection blitzes to the industry, farmers and society and to properly reward the industry for their generous support. In the focus group which occurred two weeks after the CleanFARMS™ blitz only one of the nine participants had heard about the blitz.

Holding collection blitzes is a great service to farmers and it demonstrates the industry's commitment to the environment. This is excellent public relations material and it should be capitalized on in marketing campaigns. As well, by raising awareness more farmers may participate, thereby improving the success of the program. Developing a branding strategy which extends to the supporting solutions and potentially complementary programs and then living the brand would help foster the greater awareness, participation and reward.

Recognizing the need for a new brand, CropLife Canada decided to make a change and create a separate, stand-alone company called CleanFARMS™ Inc. Beginning on February 1, 2010, CleanFARMS™ will assume all of the assets of CropLife Canada's empty pesticide container recycling program and obsolete pesticide collection program. CleanFARMS™ is a not-for-profit industry corporation and is not only to operate the two current programs, but, if appropriate, will operate other end-of-life management programs for other agricultural industries. CleanFARMS™ could be the lead organization for future combined collection campaigns and the brand to which the partial solutions could connect to.

6.2 Network of Return Depots for Animal Health Products and Sharps

The second option for a province-wide solution is a network of return depots established at ag service providers across the province. This option is for animal health products and sharps only. The return depots could be held at a combination of location types including; ag retailers, veterinary clinics, ag colleges, public health buildings, pharmacies, etc. A lead organization would establish the return depots, logistical details and method to fund the disposal program.

Under this program farmers would drop off their unwanted medicines and sharps at the return depot. When the return depot gathers sufficient volume they would contact the service provider that has been arranged through the program to collect the products and properly dispose of them. The depots would collect unwanted animal health products and sharps from any farmer, not just from their own customers. Return depot locations facilitate the point of collection; they do not fund the program or deal with the logistical aspects. The number of depots would be determined based on the goals and objectives of the program. The costs to operate a return depot service are determined and managed by the lead organization. Depending on how the program was funded the return depot could be open year-round during the regular business hours of the service provider or it could be open until a maximum amount of product was collected. The funding to support the return depots could come through industry levies, government grants, user-pay and in-kind support.

Same as the collection blitz, the overall goal is for farmers to properly dispose of unwanted animal health products and sharps so that these products are not released into the environment where they could potentially cause harm. Therefore, the partial solutions (e.g. returning products to the local veterinary clinic, using municipal services, etc.) would continue to be encouraged.

6.2.1 Frequency

The return depot model is an always open concept with two variations.

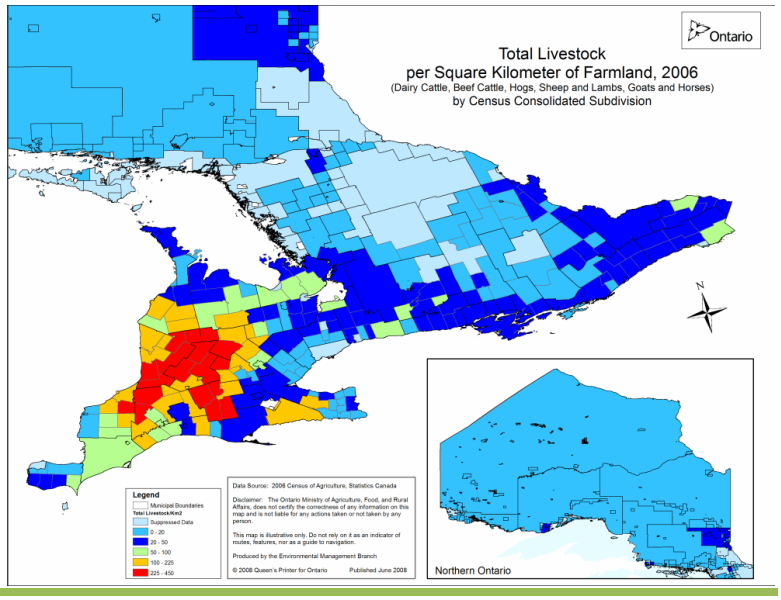
6.2.1.1 Year 'round "always open"

The return depots collect products during the sites regular business hours. If the retailer is open Monday to Saturday 8am to 6pm, then they can collect products anytime during those hours.

6.2.1.2 Always open to a maximum collection amount

The return depots collect products during the sites' regular business hours. If the retailer is open Monday to Saturday 8am to 6pm, then they can collect products anytime during those hours. Once a certain amount of product is collected during the year the site is "closed" until the following fiscal year. Using this concept would allow tighter control of program costs if there was a fixed budget. At the start of the next fiscal year the site would "re-open" and begin collecting product again.

Although operating an always-open solution is excellent service for farmers, the nature of these products and the rate at which they accumulate may not demand this level of frequency. It is not known whether the increased availability of the service will necessarily increase the volume of the product returned and therefore the cost of operating the program. Because the blitz only occurs every four years, farmers who have accumulated unwanted product may be more inclined to participate because the opportunity only comes around every four years. With return depots always being open, there is no immediacy to participate. Farmers can always bring the product in next time. In the Bring it Back pilot in Eastern Ontario, there were minimal stats collected and so it is difficult to develop strong conclusions. In 2004, records show that a total of 27 pharma pails and 16 sharps containers were collected at the four return depots.



6.2.2 Locations

The return depots theoretically could be held at hundreds of locations, given the relatively small incremental cost of each location, but such a program would be unnecessarily complex. Instead a number of depots would be determined based on the goals and objectives of the program. The same guidance concerning driving

distances and times would be considered as for collection blitzes.

If 20 depots were established across Ontario, most farmers would be required to drive less than 45 minutes one-way. The distribution of the depots may differ slightly to target the livestock-dense regions of the province.

6.2.3 Producer Behaviour

Return depots allow for farmers to dispose of products as soon as they become unusable. Farmers would not have to store the products for a lengthy period before there is an opportunity for disposal. Farmers are familiar with the concept of return depots. 60% to 70% of farmers return their pesticide containers to retailers. Ontario has excellent compliance with beer bottle returns and now liquor bottles are being returned too. In the field survey, "62.5% of farmers said if a new program was being developed for disposal of pesticides and animal medicines and they needed to take the products to a central location, they would prefer to take them back to where they purchased them."[54] People are creatures of habit so it is a reasonable assumption that if you established return depots across the province, farmers would use them.

6.2.4 Cost

An estimate for operating a collection blitz is found in the table in section 6.1.4.1. As noted earlier, should the animal health and sharps streams be handled in this manner, costs could be expected to be less on a per-location basis than less-frequent animal health and sharps blitzes.

6.2.5 Branding

The concept of branding this program is important to generate awareness of the program and to properly recognize the industries and volunteers that are doing the right thing. If the animal health industry decided to adopt this model and lead it themselves they would want to establish their own brand. Each of the locations whether a veterinary clinic, ag retailer or ag college would use consistent logos to create program awareness.

6.3 Contributory Solutions

Using accepted on-farm disposal practices, veterinary, ag retailer, municipal and private services, allowing natural market shifts in farming practices to occur and continuing to encourage farmers to only buy what they need and use what they buy need to be consider part of the overall solution and encouraged. The lead organization should determine strategies to partner with these groups and create awareness of these options to farmers. Bringing these options under the overall brand strategy would help generate awareness of the issue and the options among farmers and reward those organizations that are doing their part to support farmers.

A campaign for safe disposal of the three product streams could be developed to operate independent of any location or facility. Any service location or municipality that participates and accepts these products

[54] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.

would be given a sign for their window and/or sticker for their car. Farmers would come to recognize the name / logo and each time they see the name / logo it would help bring awareness to the issue and where / how they can properly dispose of the products should they end up with an unwanted product.

If the crop protection industry and the animal health and sharps industries choose to operate a combined collection blitz, making use of these contributory solutions would help them help farmers dispose of some product between collections. Also, developing relationships with municipalities, retailers and veterinarians could be helpful in operating current programs (container recycling, obsolete product collection) and for additional programming in the future e.g. bale wrap recycling.

6.4 Implementation of a Province-wide Solution

6.4.1 Strong Industry Leadership

To establish either of these models and fully encourage the use of the partial solutions where relevant, strong leadership is needed. The leader needs to have an ennobling vision that others can adopt and support. For the pesticide industry CropLife Canada has played this role very well. With CleanFARMS™ in place and looking for complementary programs, they could take on the future leadership of an expanding initiative. CropLife Canada / CleanFARMS™ has the experience in operating stewardship programs and has shown through the 2009 blitz that adding animal health products and sharps is a logical and easy extension.

6.4.2 Funding and the Regulatory Environment

CropLife Canada has found that it is getting more difficult to obtain grants from government for the obsolete collection and disposal programs. Government's priorities can shift, leading to less money in the future to fund existing programs or public/private partnerships.

Using the principles of extended producer responsibility is a proposed new direction Ontario is moving towards. This will shift the cost of end-of-life management to the product manufacturer and first importer. CropLife Canada is already engaged in this concept but may over time have to shoulder the full cost rather than sharing it with government. The animal health industry is in the initial awareness stage of this principle and has not been consulted or advised on what their role would be in an environment of extended producer responsibility. The industry is prepared to do its part in environmental stewardship; however it wants to ensure that its activities are proportional to the risk and that the program has real outcomes relative to the environment. Through CAHI, the animal health industry participated in the 2008 collection pilot for animal health products and sharps both with financial and in-kind support. In the 2009 CleanFARMS™ collection no financial support was given but significant in-kind time was donated.

Ontario is moving towards a more regulatory environment in the agriculture sector. Recent examples include: Ontario enacting the new Animal Health Act, changes to the Ontario Occupation Health and Safety Act to include Ontario's farming operations and the federal and provincial agriculture ministers publically stating that traceability will be mandatory on farms by 2011. Government has not mandated the manufacturers of agricultural animal health products and sharps to pay for end-of-life management yet, but

this is occurring for human pharmaceuticals and sharps in 2010. The industry has an opportunity now to control its own destiny regarding how they would want to handle the end-of-life management of their products rather than being regulated into action.

6.4.3 Developing a Funding Mechanism

To be in line with the government's direction on extended producer responsibility, it is the industry that should pay for the end-of-life management of their products including the administration costs of a disposal program. These costs can then become part of the purchase price of the product or be charged to the consumer at the time of disposal. Using this principle encourages the industry and the consumer to consider and pay for the waste they generate.

As mentioned earlier, CropLife Canada has an established funding mechanism. It costs approximately 3.2 cents per package of product sold.[55] This amount generates enough funds to operate their collection and disposal of unwanted pesticides.

The animal health industry does not have an established funding mechanism. For an industry funded program there are two options; a funding levy and a user-pay system.

There are three benefits of a levy system:

- The levy is essentially invisible. Farmers pay it without consideration.
- Similar to insurance, everyone pays into large pool which funds the small amounts that need to be disposed of. Therefore the cost becomes very minimal for each farmer.
- For any farmer that would see cost to participate in a disposal program as a barrier, they levy system essentially removes this barrier.

There are three benefits of a user-pay system:

- Only the users pay
- Discourages people from generating waste in the first place
- It could be easier to implement.

The user-pay system is used in New Zealand's Agrecovery program for animal health products and sharps. The concept is also in effect at many municipalities where garbage tags, prepaid bags and landfill tipping fees are charged.

For the 2009 collection blitz the cost of disposal for animal health products and sharps was $19,000. A permanent program for these products, as recommended in this study, would result in allocating a share of the organization and overhead costs to the industry, for a combined-stream program, plus any sector-specific costs that would accrue to the industry's participation, as provided in the Pro-forma Estimates

[55] 3.2 cents is a 10 year average. The levy fluctuates each year depending on which regions of the county are holding a collection program.

provided in this report. It appears, however, that the incremental cost of an animal health product program would not be a significant portion of the industries' revenues, valued at $565 million annually.

As mentioned earlier, CAHI has stated that there are federal regulations directing the way that patented products are priced in Canada; simply adding a disposal levy to the cost of the product is not possible without a change to the enabling legislation or its provisions.

As an option, the manufacturers could be bypassed and retailers appointed to tax the animal health products. Retailers of livestock medicines are licensed so it would be reasonably easy to locate them and mandate this. Retailers would charge farmers whatever the necessary tax was on each animal health product to generate enough funds to operate a collection and disposal program. The funds collected would be sent to the disposal program administration. However, mandating a tax at the retail point is not consistent with the principles of extended producer responsibility. The manufacturers are not engaged, and have no incentive to consider the environmental consequences of their products.

The sharps manufacturing industry was not contacted for this study to determine their position and current involvement in the stewardship of their products. Beginning in July 2010, Stewardship Ontario will be charging sharps manufacturers a levy for disposal of sharps used in the residential setting. To develop a collection and disposal program for sharps used on farm, the manufacturers would need to establish a funding mechanism. Through the principles of extended producer responsibility, the responsibility of the end-of-life management of the sharps belongs in part to the manufacturer. The Canadian animal health industry could partner with the sharps manufacturers on a program but the proportion of costs related to sharps needs to be borne by the sharps manufacturers.

6.4.4 Using Community-based Social Marketing Techniques in Agriculture

Once a program has been designed with minimal barriers, it needs to be delivered in a way to garner the greatest participation. Farmers in the focus group touted the Grower Pesticide Safety Course as being instrumental in changing their attitude and behaviour regarding proper handling of pesticides. McKenzie-Mohr's teachings would explain that it was not specifically the act of farmers reading a text book on pesticide safety that changed their behaviour, but that as the program itself was carried out at the community level, a new norm was fostered in the agricultural community and farmers committed that they would follow certain practices.

McKenzie –Mohr states that for a successful program and resulting behaviour change to occur, personal contact should be "emphasized because social science research indicates that we are most likely to change our behaviour in response to direct appeals from others."[56] In that all farmers attended a common training program together with neighbouring farmers helped to create a new community norm around pesticide handling, and it appears, around farm waste management generally.

[56] Fostering Sustainable Behaviour by Doug McKenzie-Mohr p6.

McKenzie-Mohr also states that gaining a commitment from an individual is key to people actually carrying through with an activity, "People have a strong desire to act consistently with what they say they will do."[57] The farmers who have attended the collection blitzes in past years have participated in a community-based, organized activity that in essence commits them to practice specific behaviours regarding pesticide handling, including proper disposal.

The Livestock Medicine Education Program is a comparable program to the Grower Pesticide Safety Course, but it is voluntary. Farmers who take the course are instructed on safe handling and disposal practices for veterinary medicines but currently there is no overt commitment encouraged to be made by farmers to follow the practices taught in the course. Failing such as additional aspect, moving the course to mandatory status, as was anticipated when it was originally introduced, would replace the voluntary commitment. The Role of Regulation and Enforcement

People respond differently to incentives, therefore both incentives and regulations may be needed to generate behaviour change on sustainable practices across the full farm community. It is in this aspect that a CBSM-based solution to the end-of-life disposition of these products differs from other farm programs. If industry does not do their part on environmental issues on their own initiative, then it is government's role to set the policy, regulate it if required and then enforce the activity.

The Environmental Farm Plan (EFP) and standards for manure management are widely-known examples of this. The EFP program was developed by farmers in the mid-1990s. Environmental best management practices (BMP) were developed and encouraged on a voluntary basis. Financial incentives were matched to the BMPs to increase uptake with farmers. Despite the financial and good "green feeling" incentives, the voluntary efforts were not sufficient to protect the water resources in Ontario so the government implemented minimum standards for the management of manure on large farms. Once the activity was regulated, a much higher level of compliance was immediately attained. The voluntary programs continue for the areas that have not been regulated and appear to be functioning well.

Through the powers of the Pesticide Act and the Ontario Water Resources Act farmers are required to handle pesticides properly. They can be held accountable if they improperly use pesticides and it results in harm to the environment. Regulation and the threat of enforcement is the backstop on the issue of properly using and handling of pesticides. In the producer survey "85.5% of farmers said that avoiding enforcement is a factor that would influence their participation if a new way of disposing of animal medicines and pesticides was developed in the future."[58]

For waste animal health products and sharps, quantities are small and some farmers do not equate improper disposal with environmental consequences. Industry can establish a code of practice for normal farm practices which would include how to and how not to dispose of these products. However, encouraging

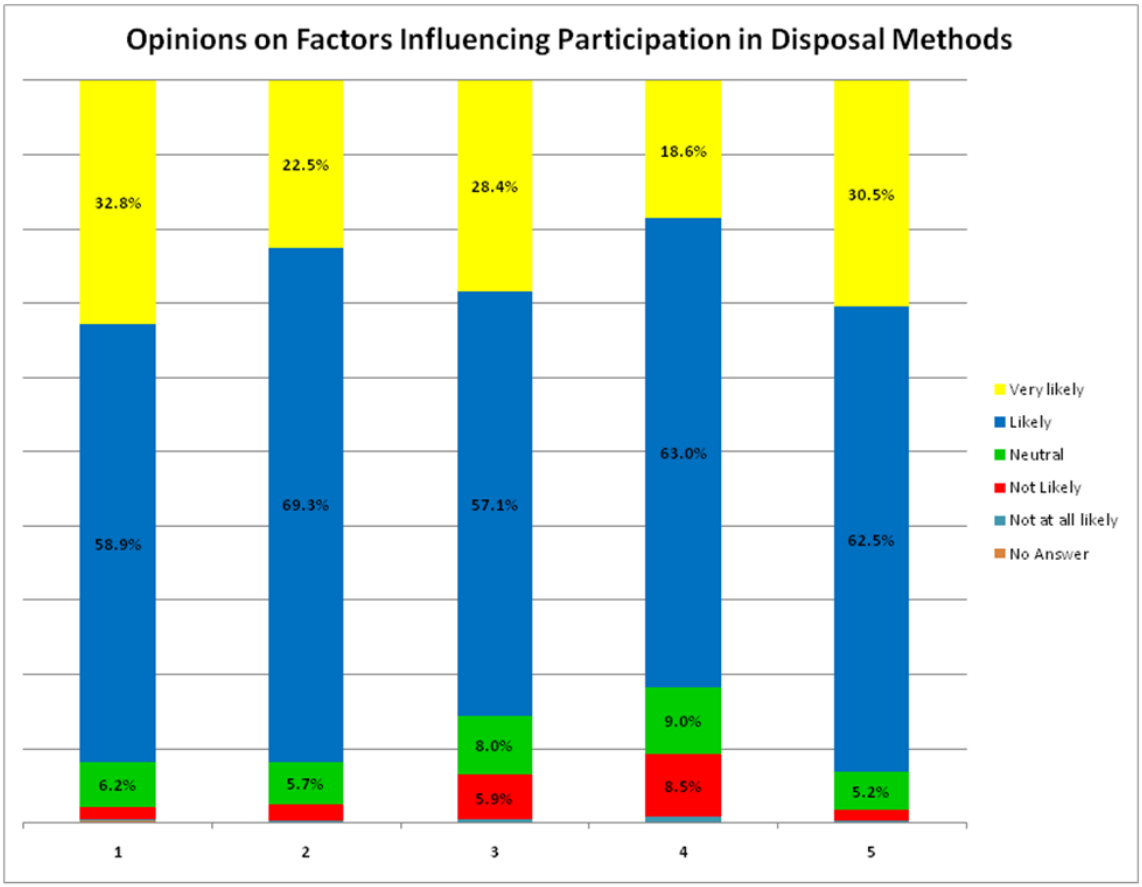
[57] Fostering Sustainable Behaviour by Doug McKenzie-Mohr p19.

[58] Awareness and opinions of the collection and disposal of pesticides and animal medicines producer survey by Strategic Research Associates, 2009.

these practices solely through CBSM approaches will be a departure from the implementation methods used in the relatively recent past in these program areas.

6.4.5 Making it Happen with Farmers

If the agriculture industry wants farmers to properly dispose of unwanted livestock medicines and sharps used on farm, the industry needs to determine what the acceptable options are, develop an effective program(s) to dispose of unwanted medicines and sharps and teach farmers what the acceptable disposal options are. If the industry can do this at the community level and get farmers to commit to following certain behaviours, the majority of farmers will likely change their behaviours as they have done with pesticide handling and manure management.



1: Safe disposal of pesticides and animal medicines is the right thing to do
2: It will make my operation safer
3: I want to avoid possible enforcement action
4: I want to show other producers that I am being environmentally responsible
5: I want to reassure consumers that I am being environmentally responsible

Regarding pesticides, farmers have acceptable options to dispose of unwanted pesticides including; the CleanFARMS™ collection blitzes, applying pesticides on fallow land or a label crop according to label guidelines and taking unwanted pesticides to the municipal landfill (if accepted). The industry should

continue to encourage farmers to attend training on proper disposal through the Grower Pesticide Safety Course and continue to offer and promote the CleanFARMS™ programs. The industry should also encourage farmers to buy what they need, use what they buy to reduce the amount of pesticide that becomes unwanted.

The producer survey found a small segment of 9.5% of farmers that are unlikely to change the way they dispose of unwanted pesticides, animal health products and sharps. This segment is made up of farmers who are intending to exit the industry or make a significant transition in the industry. These farmers tended to be less engaged in the industry and are winding down their operation or in status quo mode. The unique circumstances presented by these farmers may predicate that a specialized program may be needed to address them; a targeted farm clean-up program to leave the farm in a clean, safe state may be attractive.

6.4.6 Ongoing Marketing, Education and Awareness and Rewards

To operate a meaningful program as described earlier, a marketing strategy needs to be developed to raise awareness to the issue and participation among farmers. Education is very important because not all farmers may realize that their behaviours are undesirable. If they don't know, they can't be expected to behave differently.[59] "*If I throw a bottle of old medicine into the garbage and it goes to the dump, how big of a problem is it?"* and "*I don't have a problem with bale wrap. I bury it on the side of the gully down by the creek to stop erosion.*"[60] These farmers will not change their behaviour until they are first aware, have a suitable option and a community norm is established on the accepted and unacceptable practices.

The industry, farmers and all the supporting people and organizations need to be properly rewarded for *doing their part*, especially during the initial period. Changing behaviour is very difficult. Paying for something that used to be "free" hurts. Thanking, encouraging and reinforcing the benefits to people and industries that are making changes will help generate positive feeling and ease the transition.

6.4.7 Administration and Governance

The province-wide solution must be a reasonably simple program administratively because the size of the issue of these unwanted product streams is small. As well, if complicated administration results in paperwork for farmers, that will be a major barrier to their participation. Both the combined collection blitz model and the return depot model can be administratively simple programs. Complicated administration structures and requirements will bury the good intentions of the program.

The combined collection blitz has a head-start on administration. CropLife Canada / CleanFARMS™ has established administration for single stream collection blitzes, as well, the learnings from operating the 2009 combined collection blitz are now being digested. Based on the experience with the Bring it Back pilot, the

[59] Through this study it was found that some farmers believe that the volume of a product is the only factor that relates to its ability to harm the environment. Toxicity is affected by the chemical agent, concentration, volume, route of exposure, its half life and inertness and the metabolites which it breaks down to.

[60] Conversations with two Ontario farmers.

return depot concept appears to be administratively simple, but the administrative challenges would not be fully known without additional research and then implementation.

CropLife Canada / CleanFARMS™ would be the obvious choice for the administration of a combined blitz model. CleanFARMS™ mandate is to manage the obsolete pesticide collection program and other complementary programs. They already have the experience required.

If the animal health and sharps industries chose to adopt the return depot solution an administrator would need to be identified. Possible administrators could include; CAHI, any animal health company, OVMA, a large retailer (e.g. GROWMARK or the Coop) or CleanFARMS™. The deciding factors and benefits to becoming the administrator may be different for each of the organizations.

Using the retailers of the products (crop protection retailers, licensed retailers of livestock medicine and veterinarians) to facilitate the collection and disposal programs is a natural fit. It shows their contribution to the solution and provides service to their customers and their industry. The retailers may gain additional benefits by supporting these program including; increasing traffic to their business, additional contact points with their customers and potential customers and good public relations.

Good governance of the program is key to the success and credibility of the program. Whichever organization administers the program needs to have a governing board to ensure the program remains true to the stewardship principles it is based on, is transparent, is making efficient and effective use of its resources, is accountable to its stakeholders, is equitable and inclusive to all farmers and manufacturers in Ontario and is operating within the parameters of the law.

6.4.8 Operational Issues

A significant challenge for the animal health industry as was stated earlier in the report is the issue of importation for 'own-use' of animal drugs and the use of active pharmaceutical ingredients. "In a benchmarking survey conducted in 2006 by the International Federation for Animal Health, titled 'Benchmarking the Competitiveness of the Canadian Animal Health Industry' found that unlike other developed countries surveyed, Canadian law permitted the importation and use of non-Canadian licensed product. Canada permits animal owners to import products for their own use and active pharmaceutical ingredients or bulk chemicals are permitted for use by health professionals. This market was estimated to have a value of $100 million, which is actually 30 – 40 % of the sale of Canadian licensed drugs."[61]

With such a large percentage of animal medicines coming into Ontario in this manner, how do you establish a program to dispose of these products fairly? The principles of extended producer responsibility deal with this by charging the first importer. In the case of imported pharmaceuticals for 'own-use', the first importer is the farmer. Finding and charging the farmers involved in this practice would be difficult and costly.

[61] Presentation by CAHI to the Senate Standing Committee on Agriculture and Forestry, April 10, 2008.

An alternative is not accepting imported pharmaceuticals through the collection and disposal program. This would be difficult to manage, and from an overall perspective, it does not solve the issue of what to do with those unwanted products.

In New Zealand's Agrecovery they have developed a solution on the implementation side that could potentially address this issue. The manufacturers of pesticides in New Zealand are not required to be members of Agrecovery and pay the corresponding fees. The Agrecovery program collects and disposes of unwanted pesticides from farmers for free if the pesticide is from a member company. Farmers who have unwanted products from non-member companies have to pay for the disposal costs. Implementing this through collection blitzes or return depots would add a level of complexity to the administration. Further study should be done to determine if the additional administration complexity is greater than the cost of disposing of the imported animal health products.

The industry should look to the government for support on the issue of imported pharmaceuticals as the problems extend well beyond fairly implementing a disposal program for unwanted livestock medicines.

7 Conclusion

Environmentally-responsible disposal of agricultural waste is important to farmers, industry and government, but within this large issue, proper disposal of unwanted pesticides, animal health products and sharps risks being seen as a relatively small component of the larger whole. Farmers see agricultural waste as one issue and wish the solution was solved through one program as opposed to several confusing programs with too many rules that change regularly.

> "*Containers go to the Co-op, tires go to the garage but only 4 at a time, paint goes to the dump but the lids have to be off and the paint dried, oil goes to my neighbour's furnace, batteries to Home Depot, garbage to the end of the lane, table scraps to the dog, sharps to the vet, bale wrap to the garbage, etc, etc, etc".*

Farmers would like waste disposal to be solved as one issue not a series of separate problems.

The amount of unwanted product stored on farms across Ontario is not known. The volumes of unwanted products do not reoccur quickly. Farmers are therefore not concerned about how to properly dispose of these products until they have an accumulated amount that they need to dispose of.

An assessment of the risk of these products being released into the environment was not within the scope of this study. Farmers see a clear risk with improper disposal of pesticides but the link between animal health products and the environment is not as clear. It may be worthwhile to research the volume of unwanted animal health products and sharps stored on farms across Ontario and to complete a scientific risk assessment on improper disposal of these products.

There are several ways to operate a collection and disposal program for these three product streams. The best solutions are a combined collection blitz that collects all three product streams or a return depot for animal health products and sharps and a single stream collection for pesticides. Supporting these options are a series of partial options including returning products to veterinary clinics, ag retailers, municipal landfills, appropriately disposing of products on-farm and making better purchasing decisions to avoid unwanted products in the first place.

Government is moving in the direction of extended producer responsibility and a more regulatory environment. They believe it is the industry that should be responsible for the end-of-life management of the products they produce. As industry incorporates this cost into their product pricing, consumer end up paying for the product, its packaging and the cost of disposal when the product is no longer wanted.

Retailers should have obligations as members in the chain. Retail points can help in facilitating the actual collection program and assisting with education on the issue and options for disposal, as well as, assisting farmers with appropriate purchasing. There are some costs (in-kind) for retailers assisting with the collection

but they can benefit by driving traffic to their business and with positive public relations for *doing the right thing.*

Farmers are willing to participate in proper disposal programs. They want to *do the right thing*, reassure consumers and avoid enforcement. Particularly with pesticides, they understand that improper disposal can harm the environment. Farmers see paperwork and having to drive too far as barriers to their participation. If they can get there in thirty minutes and they are not busy with a more pressing job, they will participate. Farmers know they will pay for disposal in the end and it is not seen as a significant barrier to their participation in a disposal program.

When encouraging behaviour change toward a new sustainable practice, the tools of community-based social marketing can help garner the greatest participation and impact. Programs need to be designed to minimize the impacts of any barriers to participation and capitalize on the benefits. The program is more effective if it can be rolled out in a community setting with personal contact. If a commitment can be gained by the participants then the likelihood of behaviour change occurring is greater. If all of this occurs a new community norm will be established. For proper disposal of pesticides, animal health products and sharps, community-based social marketing techniques can and are being used to encourage a community norm around proper handling and disposal. Through the Grower Pesticide Safety Course farmers have developed improved handling practices.

Experience from the CropLife Canada / CleanFARMS™ collection blitzes, the 2008 AGCare pilot and the Bring it Back pilot has shown it is quite reasonable to conclude that *if you build it, they will come*. That being said, using the tools of community-based social marketing will encourage the behaviour changes and help develop the community norm.

Regulation and enforcement is still required. Changing behaviour is difficult, especially if it costs time and money. Not all people or businesses want to accept their environmental responsibilities so regulation and enforcement help spur the behaviour change and acts as the backstop for those opposed to the change.

Education and awareness are key in any waste disposal program. If we can reduce the size of the problem, less disposal will be required. Recognition and reward is important for all players in the complete industry to help keep momentum going during the change period and then to sustain the new behaviour.

Appendices

Appendix A – In-depth Producer Interview Results

Slide 1

Slide 2

Slide 3

Appendix B – Field Survey

Collection and disposal of farm pesticides and animal health products

Quantitative survey

September 2009

INTRODUCTION:

Hi, my name is _____ and I am calling from Strategic Research Associates in Guelph. We are doing a project for AgCare. AgCare is a coalition of farm organizations committed to communicating about agriculture and the environment.

We are talking to producers throughout Ontario to get their thoughts and opinions on the collection and disposal of pesticides and animal medicines.

We would like about ten minutes of your time, to get your input and suggestions on the topic. Can we do this right now?

QUALIFIER QUESTION

When it comes to making decisions about the operation of your farm how involved would you be?

a. I make most of the decision about our operation
b. I am involved in making some of the decisions
c. I am not involved in making decisions about our operation.

IF ANSWER IS C, ASK TO SPEAK TO THE PERSON THAT IS INVOLVED IN MAKING MOST OF THE DECISIONS. IF THAT PERSON IS NOT AVAILABLE ASK:

Does the disposal of pesticides and animal medicines ever come up in your conversations with those you farm with or with other farmers?

i. Yes
ii. No

SURVEY QUESTIONS

1. What kind of farming operation do you currently have? (READ LIST, SELECT ALL THAT APPLY)
    a. Field crop production
    b. Dairy
    c. Egg production
    d. Livestock production (including poultry, pork, beef, etc.)
    e. Horses (breeding or selling, not recreational)
    f. Vegetable or fruit crop production
    g. Greenhouse or nursery
    h. Organic farming
    i. Other_____

IF ANSWER IS h, ASK IF THEY EVER HAVE ANY PESTICIDE OR ANIMAL HEALTH PRODUCTS TO DISPOSE OF. IF NOT, TELL THEM THAT SINCE THE SURVEY DEALS DIRECTLY WITH PESTICIDE AND ANIMAL MEDICINE DISPOSAL, IT WON'T APPLY TO THEM. THANK AND TERMINATE.

2. How many acres are you currently farming (including owned and rented land)?
    a. _____

KNOWLEDGE

First we have a few thoughts about the pesticides and animal medicines and their relationship to the environment. For each statement please tell me if you strongly disagree, disagree, agree or strongly agree:

3. Proper collection, storage and disposal of pesticides an animal medicines is an important part of how I manage my farm (READ LIST)
    a. Strongly Disagree
    b. Disagree
    c. Neither agree nor disagree (DO NOT OFFER THIS CHOICE)

d. Agree
e. Strongly Agree

4. Preventing the release of pesticides and/or animal medicines into water resources near my farm is as important as preventing the release of manure, gasoline or excessive sediments (READ LIST)
    a. Strongly Disagree
    b. Disagree
    c. Neither agree nor disagree (DO NOT OFFER THIS CHOICE)
    d. Agree
    e. Strongly Agree

5. The release of **pesticides** into the natural environment has an impact on water quality in the Great Lakes (READ LIST)
    a. Strongly Disagree
    b. Disagree
    c. Neither agree nor disagree (DO NOT OFFER THIS CHOICE)
    d. Agree
    e. Strongly Agree

6. The release of **animal medicines** into the natural environment has an impact on water quality in the Great Lakes (READ LIST)
    a. Strongly Disagree
    b. Disagree
    c. Neither agree nor disagree (DO NOT OFFER THIS CHOICE)
    d. Agree
    e. Strongly Agree

And thinking about your own farm operation's waste management practices…

7. How much have they changed in the last 10 years? (READ LIST)
    a. Not changed at all
    b. Changed a little
    c. Changed a lot

IF ANSWER TO Q7 IS a SKIP Q8:

8. Please give me an example of how your own farm operations' waste management practices have changed? (OPEN END, PROBE AND CLARIFY AND CODE INTO ONE OF THE CATEGORIES)
    a. Reduced waste in general
    b. Stopped burying waste on farm
    c. Improved storage of waste
    d. Returned empty/unused pesticides back to the retailer
    e. Other _____

CURRENT PRACTICES

9. Thinking about how you currently dispose of pesticides and or animal medicines, which statement best describes your situation? (READ LIST)
    a. We're already doing everything we can
    b. There could be **a little bit of** improvement in how we dispose of products
    c. There could be **a lot of** improvement in how we dispose of products

10. How do you currently dispose of mixed trash/garbage/waste from your farm operation (not including household garbage)? (OPEN END, PROBE AND CLARIFY AND CODE INTO ONE OF THE CATEGORIES
    a. Dispose of it on farm through burial/burning
    b. Take it to my local dump
    c. It is picked up on a regular basis by my municipality
    d. Other (specify)_____

Next few questions are about materials that aren't disposed of in the regular waste stream.

11. How are you currently disposing of your old/unused pesticides (including empty containers)
    a. I take them to a crop protection dealer in my area for disposal when they have one of their "blitzes"
    b. I use the services of a custom sprayer and they deal with the pesticides
    c. I am storing all the old/unused pesticides on farm for future disposal
    d. I am disposing of the old/unused pesticides on farm
    e. I am sending them away for disposal elsewhere
        i. Where? (specify)_____

12. And at the end of every growing season, how frequently do you end up with any crop protection products that can't be used again and need to be disposed of?
    a. Never
    b. Sometimes

c. Every year

IF NOT LIVESTOCK PRODUCER SKIP TO NEXT QUESTION:

13. And how are you currently disposing of your old/unused animal health products (including sharps/needles, empty containers, etc.)?
    a. The vet takes them away for disposal
    b. The animal health supply company (DAYCO, etc.) takes them away for disposal
    c. I am storing all the old/unused animal health products on farm for future disposal
    d. I am disposing of the old/unused animal health products on farm
    e. I am sending them away for disposal elsewhere
        i. Where?(specify)_____

14. Are there any other products that you have on your farm that cannot be disposed of in the regular garbage?
    a. No
    b. Not Sure
    c. Yes
        i. Treated seed
        ii. Medicated feed
        iii. Other (specify)_____

IF NO OR NOT SURE TO Q14 SKIP NEXT QUESTION

15. And how are you currently disposing of (INSERT FROM Q14c)?
    a. _____

BEHAVIOURAL SEGMENTATION

For the next series of questions, I will read two statements and would like you to pick the one that best describes your own situation:

16. Statement 1

a. I like to stay up to date on new developments in agriculture by taking courses and getting in depth information
b. If there are new developments I'll read about them or get information from other farmers and suppliers

17. Statement 2
    a. When commodity associations and other groups that represent farmers in Ontario promote an issue, I like to get involved directly
    b. When commodity associations and other groups that represent farmers in Ontario promote an issue, I expect other leading producers to represent my views

18. Statement 3
    a. In the next 5 years, I will be operating my farm in much the same way I am now
    b. In the next 5 years, I will have made some changes to how I operate with the goal of being more 'environmentally friendly'

19. Statement 4
    a. When the environmental farm plan initiative came out, I decided to participate fairly quickly
    b. When the environmental farm plan initiative came out, I decided to wait quite some time to participate

20. Statement 5
    a. Our farm is near an urban area and we need to keep that in mind when we are working our land
    b. Our farm is in a rural area and even though we are very careful, we don't have to be as concerned about the impact of our operation

21. Statement 6
    a. I keep up with developments in Ontario and the rest of Canada to look for different ways to make my operation safer and more efficient
    b. I keep up with developments in Europe to look for different ways to make my operation safer and more efficient

22. Statement 7
    a. When I had the opportunity to return obsolete pesticides and empty containers back to a crop protection dealer, I participated fairly quickly
    b. When I had the opportunity to return obsolete pesticides and empty containers back to a crop protection dealer, I waited a few years before doing it.

23. Statement 8

a. When it comes to agricultural news and information I mostly look to farm papers and magazines
b. When it comes to agricultural news and information I prefer to talk to leading producers in my area

24. Statement 9
    a. My farm is on or near a managed water course (i.e.Grand River, Great Lakes, other examples, please)
    b. My farm is not located close to a managed water course

BENEFITS TO PARTICIPATION

Thinking of a new/improved system for disposing of pesticides and animal health products please tell how likely the following factors would have on your likelihood of participating.

25. “It’s the right thing to do”
    a. Not at all likely
    b. Not likely
    c. Neutral
    d. Likely
    e. Very likely

26. It will make my operation safer
    a. Not at all likely
    b. Not likely
    c. Neutral
    d. Likely
    e. Very likely

27. I want to avoid possible enforcement action
    a. Not at all likely
    b. Not likely
    c. Neutral
    d. Likely
    e. Very likely

28. I want to show other producers that I am being environmentally responsible
    a. Not at all likely
    b. Not likely

c. Neutral
d. Likely
e. Very likely

29. I want to reassure consumers that I am being environmentally responsible
    a. Not at all likely
    b. Not likely
    c. Neutral
    d. Likely
    e. Very likely

BARRIERS TO PARTICIPATION

And still thinking of disposing of pesticides and animal health products please tell me if the following factors would be barriers to you participation. (RANDOMIZE AND ROTATE Q22-25)

30. There would be a cost to participate?
    a. Not a barrier at all, I would definitely participate
    b. Somewhat of a barrier, I might not participate
    c. A major barrier, I would definitely not participate

31. There would be additional work involved by producers in sorting/segregating their waste?
    a. Not a barrier at all, I would definitely participate
    b. Somewhat of a barrier, I might not participate
    c. A major barrier, I would definitely not participate

32. Producers would have to take their pesticides and animal health products to a central location for disposal?
    a. Not a barrier at all, I would definitely participate
    b. Somewhat of a barrier, I might not participate
    c. A major barrier, I would definitely not participate

33. And how likely would you be to contribute a small fee for disposal of pesticides and animal health products? (IF RESPONDENT ASKS “WHAT’S A SMALL FEE?” ANSWER ‘WE DON’T KNOW, WHAT DO YOU THINK WOULD BE REASONABLE? RECORD ANSWER)
    a. Extremely unlikely
    b. Unlikely
    c. Neither likely nor unlikely
    d. Likely

e. Extremely likely

34. Can you think of any other reasons why you would not participate in a collection and disposal scheme for pesticides and animal medicines? (OPEN END, PROBE AND CLARIFY)
    a. _____

KEY INFLUENCERS

35. Who would you look to **first** for information and guidance on pesticide and animal health product disposal practices? (RANDOMIZE, READ LIST, SELECT ALL THAT APPLY)
    a. OMAFRA
    b. Municipality
    c. University of Guelph
    d. Commodity organizations
    e. CAHI
    f. CropLife
    g. Other farmers
    h. General farm organizations (OFA, CFFO)
    i. Industry (vets, retailers, crop protection companies, etc.)
    j. other (specify) _____

STREAM QUESTION (note that this will be fully explored in the focus groups but we can establish a baseline here)

36. And which of the following options do you think you be **most likely** to participate in? (READ LIST, ROTATE, SELECT ONE ONLY)
    a. Disposing of pesticides and animal health products by taking them back to where I purchased them (may use cleanFarms example here)
    b. Disposing of pesticides and animal health products by having them picked-up at my farm
    c. Disposing of pesticides and animal health products by taking them directly to my local landfill
    d. Disposing of pesticides and animal health products on-farm

DEMOGRAPHICS

And to finish the survey, just a few questions about your farm operation

37. How would you describe your role in your operation? (READ LIST, SELECT ONE)
    a. I farm full-time
    b. I mostly farm but also do other jobs to supplement my income
    c. I have an off-farm job that provides most of my income

38. What level of gross farm sales best reflects you farm business operation? (READ LIST)
    a. Less than $100,000
    b. 100,000 – 249,999
    c. 250,000 to 499,999
    d. 500,000 to 750,000
    e. Over $750,000
    f. Refused

39. Which of the following age categories would you fall into? (READ LIST)
    a. Under 35
    b. 35-44
    c. 45-54
    d. 55-64
    e. 65 or over
    f. Refused

40. Which of the following statements best describes the stage where your farm business is at right now? (READ LIST, SELECT ONE)
    a. I plan on expanding my operation
    b. I plan on keeping things the way they are
    c. I plan on reducing the size of my operation
    d. I plan on retiring in the near future

That completes the survey. Thank you very much for your time today.

Appendix C – Field Survey Results

Ontario Agricultural Producers

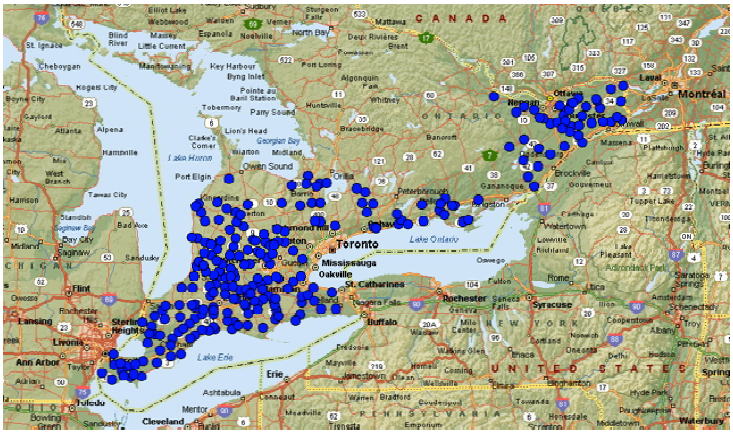
Awareness and opinions on the collection and disposal of pesticides and animal medicines

Final Analysis

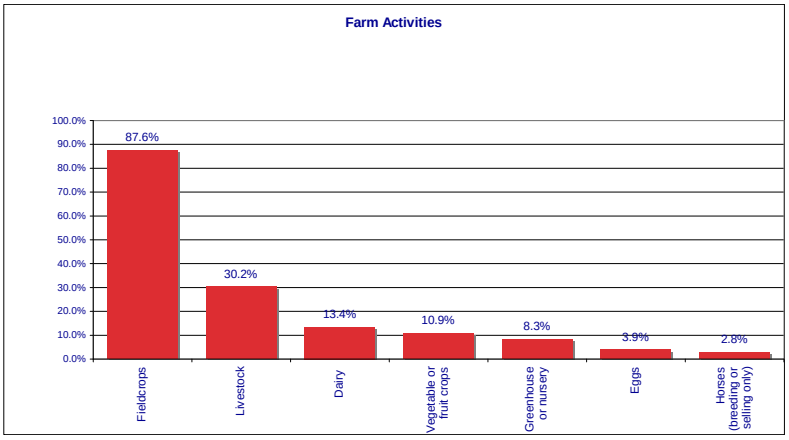
Methodology

- 387 telephone surveys across Ontario
- Results are statistically significant to within ± 5%
  - Subsamples have a lower degree of statistical significance depending on their size
- Random sample of Ontario producers with regional “soft quotas”
- Producers have ranged from a small 2 acre berry pick-your-own to a 7500+ acre cash crop multi-generational family operation
- Fieldwork was carried during harvest season. Our call centre selected times when producers were less likely to be busy
- Survey results are anonymous and confidential
- AgCare was identified as sponsor of the study

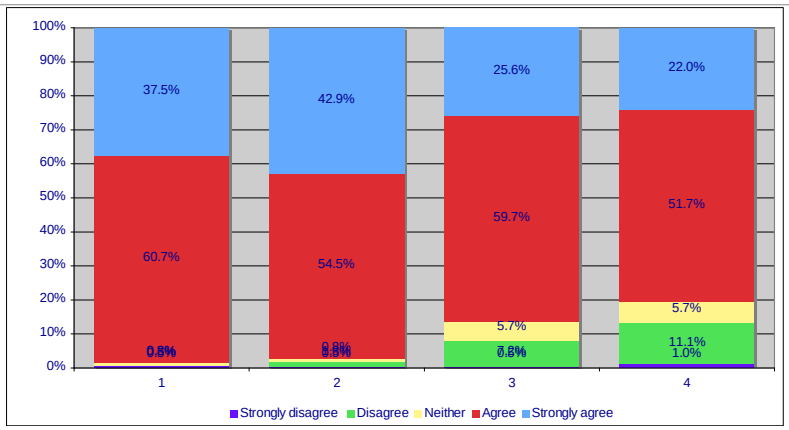
Respondent Location



Producer profile



Opinions about pesticides and animal medicines



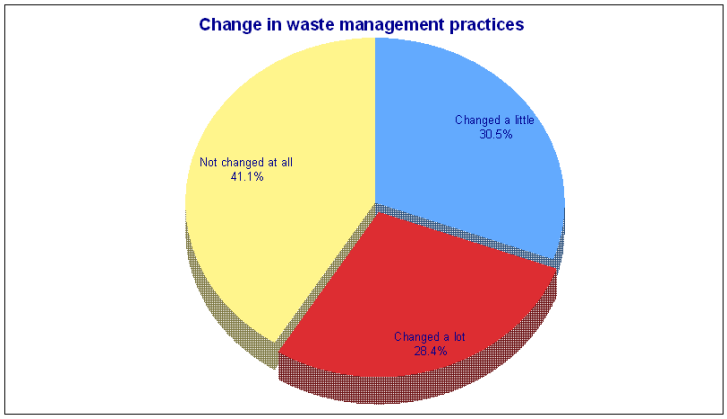
A. Proper collection, storage and disposal of pesticides and animal medicines is an important part of how I manage my farm

B. Preventing the release of pesticides and/or animal medicines into water resources near my farm is as important as preventing the release of manure, gasoline or excessive sediments

C. The release of **pesticides** into the natural environment has an impact on water quality in the Great Lakes

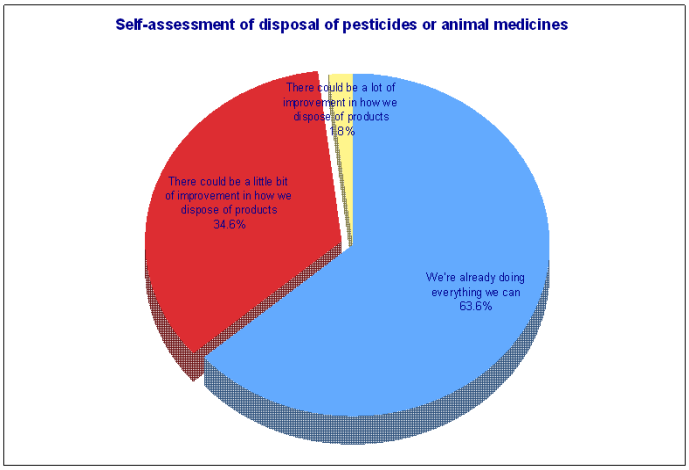
D. The release of **animal medicines** into the natural environment has an impact on water quality in the Great Lakes

Two thirds of producers have made changes

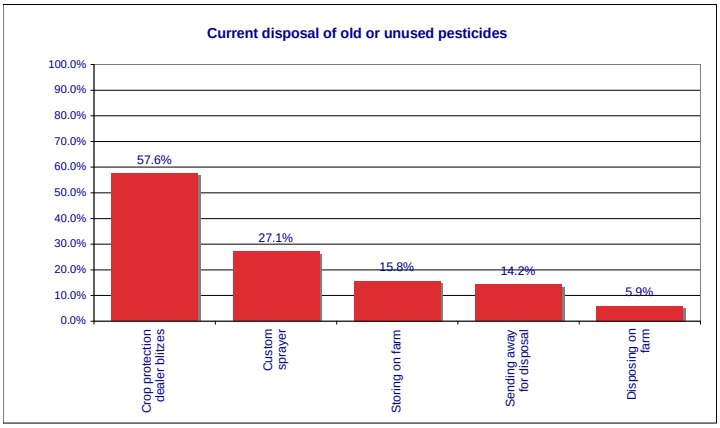


- Q7) How much have your waste management practices changed in the last 10 years

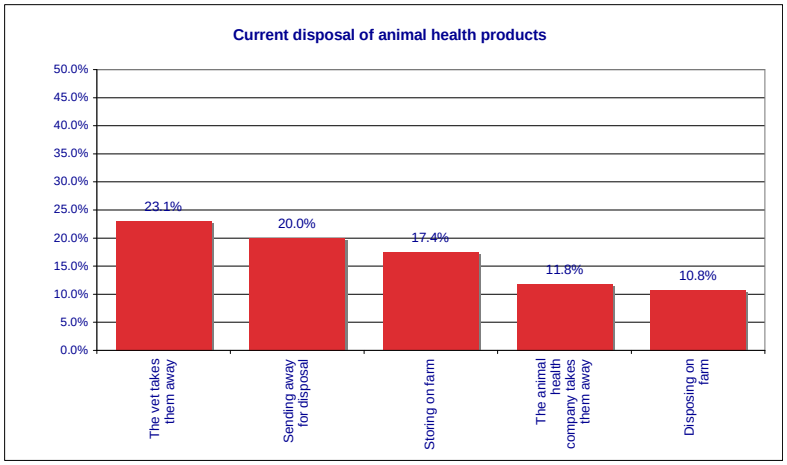
Most producers feel they are doing everything they can



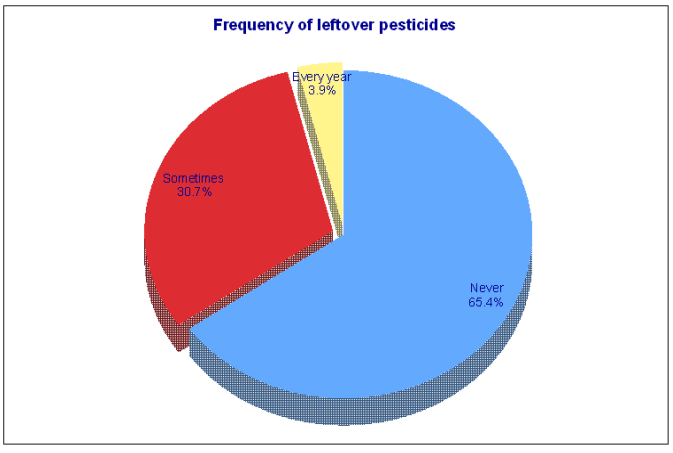
Current disposal of pesticides (including empty containers)



Current disposal of animal health medicines and sharps

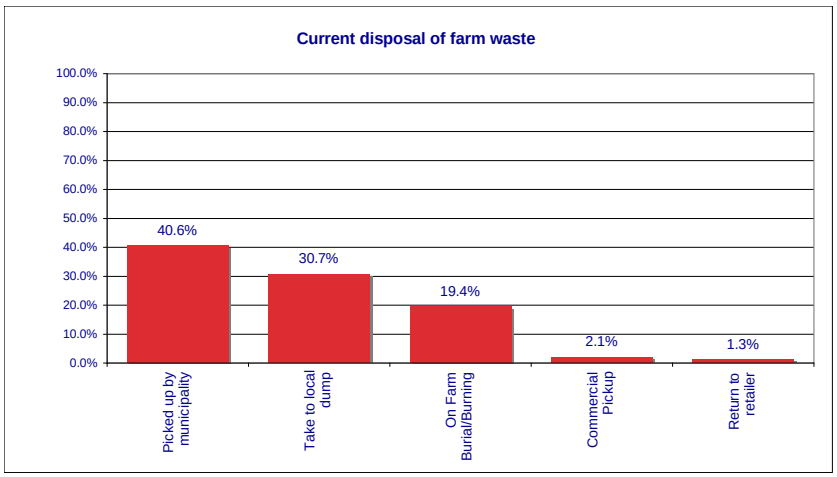


Over time there should be little obsolete product in Ontario!

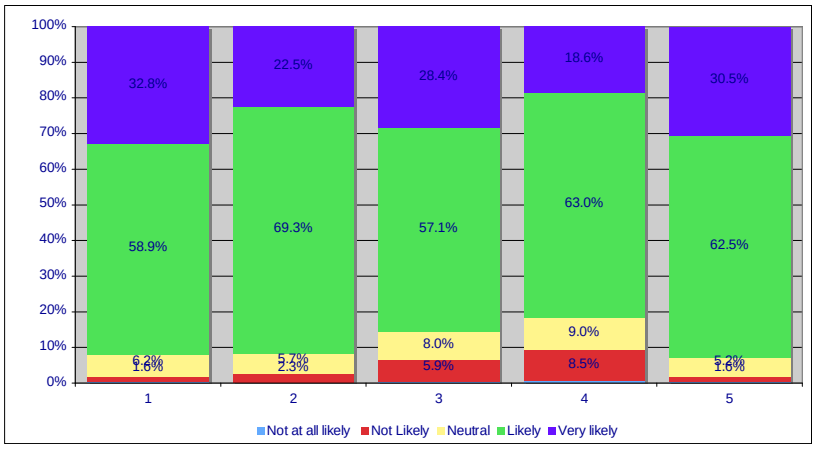


And at the end of every growing season, how frequently do you end up with any crop protection products that can't be used again and need to be disposed of?

Current farm waste disposal

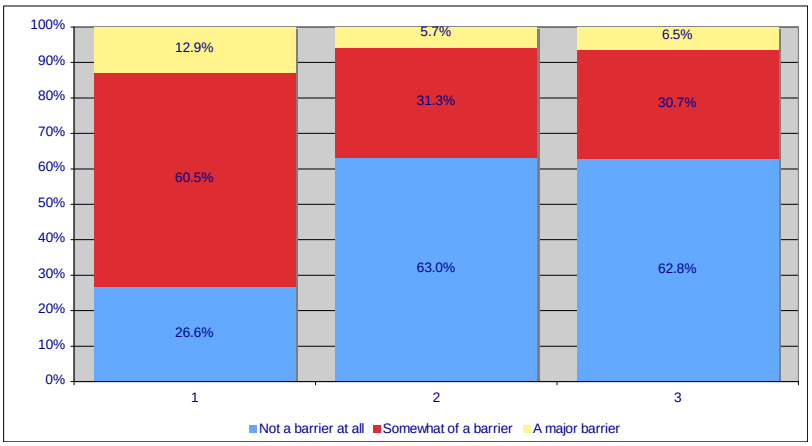


Factors that might influence participation



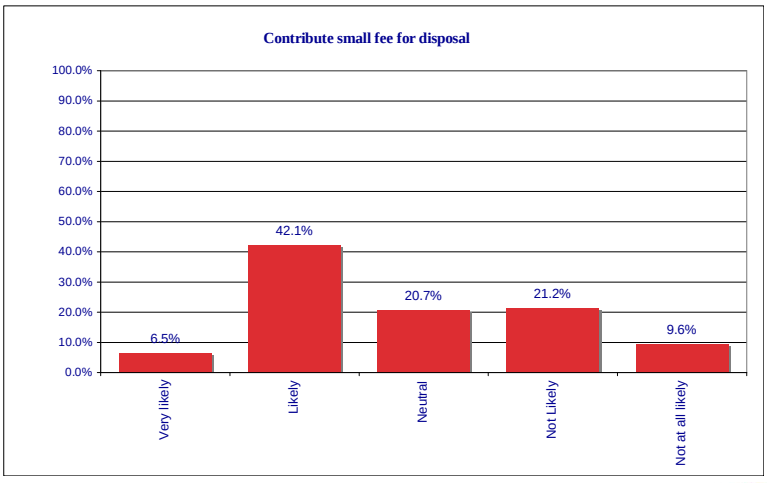
1. Safe disposal of medicines is the right thing to do
2. It will make my operation safer
3. I want to avoid possible enforcement action
4. I want to show other producers that I'm environmentally responsible
5. I want to show consumers that I'm environmentally responsible

Taking products to central location is not a significant barrier

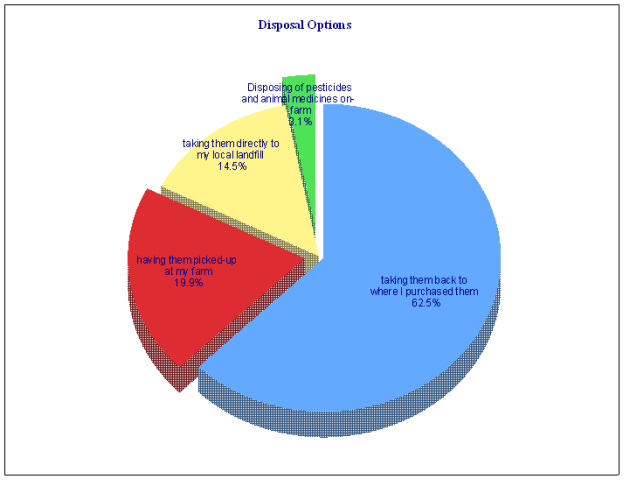


1. Cost to participate
2. Additional work in sorting
3. Take products to a central location

Some producers are open to paying a "small" fee for disposal



Drop off to purchase location is preferred option



Appendix D – Focus Group Discussion Guide

AGCare Pesticide/Pharma disposal focus groups

Guelph December 2nd, 2009

Discussion Guide

One focus group with a mix of livestock and crops. All major livestock commodities are covered.

Key objective of focus groups:

- Find out what producers are doing right now
- Determine preferences and feasibility of blitz versus depot
- Decide how best to increase awareness/market promote program.

1. Introductions (5mins)

- Moderator introduction
- Description of the process
- Explanation of video taping
- Introduction of the growers to each other

2. Current Situation (20mins)

- Things have changed in the last ten years or so. How did you use to dispose of your pesticides and other waste?
    - What has changed?
        - Are you happy with the changes?
- Why do you think we are doing things differently?
- What do you think will happen in the future?
    - Is that positive or negative?

- As a livestock producer, how much animal health medicines do you go through on your farm in an average year?

    - Is there a pattern?
- What about sharps?
    - Is there a pattern?

- How do you see empty/expired/obsolete animal health products compared to empty/expired pesticide containers?
    - Which of them "bugs" you more having them on farm?
        - Why?
        - How should they be disposed of?
        - What's wrong with them being on farm?

- Are there other farm waste products that you wish were disposed of better?
    - Which products?
    - How are they being disposed of now?
    - Why do you think they are a problem?

- Some farmers are still disposing of pesticides on farm. Why do you think that is?
    - Does it bother you?
    - Could/should something be done about it?
        - If so what?
- List: What are the main reasons why we should dispose f farm chemicals properly?
    - If environment is not mentioned, probe.
    - Probe for education and information opportunities

3. Collection Blitz (20mins)

Imagine that from time to time, there will be a collection blitz for farm pesticides/pharma and sharps. You would get notice that products would be accepted at a certain time and place.

- Where do you think it should go to (crop input retailer, vet, others)?
    - Would the location have an impact on you participating?
- How far would you be willing to drive to drop off your stuff?
    - What it there wasn't a drop-off location within your "drive"? What would you do?
    - What would make you drive just a little further
- How frequently should the blitz happen?
    - How do you think that will impact the costs of running the program?
- What if the pesticide, animal medicine and sharps had to go to different places?
    - Would you dispose of anything differently?
- What is your preferred way to find out about new programs?
- Do you see any downside to this type of program?

- Give me some ideas of why a farmer wouldn't want to participate in this
- What about cost?
    - Any idea how the pesticide blitz is paid for now?
    - What percentage of the cost of this program would farmers be willing to bear?
    - Who should bear the rest of the costs?

Let's say that the goal is to get the most farmers possible participating in this program. Will you be more likely to get rid of your pesticides/pharma/sharps if they tell you they're only collecting it on a specific date, or if you could do it anytime you want?

4. Return Depot (20mins)

Now thing of a system similar to what we just discussed, but this time there are designated return depots instead of a one time location.

- Where do you think it should go to (crop input retailer, vet, others)?
    - Any other choices beyond what was mentioned for the blitz? (challenge farmers to think of any other options)
    - What if it was not the same place where you bought the product?
- How far would you be willing to drive to drop off your stuff?
    - What it there wasn't a drop-off location within your "drive"? What would you do?
    - What would make you drive just a little further
- How often should the depots be open?
    - Year round? Part of the year? Limited hours during the day?
- What if it was done by the municipality?
    - If the location was your municipal dump/waste station?
- My dump lets me dump recycling for free but charges me $3/bag of garbage and a nominal fee for other stuff. If there was a small charge for pest/pharma would you still do it?
    - How often?
- For those who don't have access to municipal dumps: Why do you think that is?
- What if you had the choice between the municipality and the place where you buy the stuff. Which would you choose?

5. Break

6. Design Exercise (10mins)

Split into two groups: of 4-5 farmers select the farmers to ensure balance.

You are in charge of putting together “efficient” and “effective” farm waste disposal program

- Pick from following options:
    - Location
    - Products
    - Distance
    - Frequency
    - Cost
    - Other factor

Look at the two programs. Discuss why you chose what you did.

Now, you’re in charge of getting all other farmers in Ontario to buy in. How would you do it? Break it down into:

- Messages (if they’re stuck here, we can introduce Barry’s messages)
- Marketing
- Fines
- Education
- Peer pressure
- Other tactics

7. Other issues for discussion (20mins)

Wrap up and additional comments (5 mins)

Appendix E – Letter from CAHI

October 30, 2009

Mary Ferguson
eBiz Professionals Inc.
Suite 107 - 150 Research Lane
Guelph, Ontario N1G 4T2

Dear Mary;

I am writing this letter to address the Questions for Animal Health Companies that you circulated to our office on September 23, 2009 relative to the Feasibility Study eBiz is conducting on the Clean Farms 2009 initiative. The Canadian Animal Health Institute (CAHI) is the trade association representing the manufacturers and distributors of animal medications in Canada. CAHI members represent 95% of the companies that sell animal medications to veterinarians, producers and in some cases to the livestock retail outlets who sell over-the-counter (OTC) medications to Ontario farmers.

As we have indicated previously, CAHI members are good environmental stewards who take significant steps to ensure the safety of all of our products to the people administering the medications, to the animal receiving the treatment, in ensuring no harmful residues in food animal products and in the environment. All drugs sold by CAHI members undergo a thorough review by scientists in the Veterinary Drugs Directorate, Health Canada, the Veterinary Biologics Section, Canadian Food Inspection Agency (vaccines/biologicals) the Feed Section, CFIA (medicated feeds), or the Pest Management Regulatory Agency, Health Canada (animal pesticides). All our licensed medications must meet the strict criteria of these agencies for product safety, efficacy and integrity.

We recognize that the scope of the feasibility study does not address the examination of evidence as to the impact of current disposal practices on the quality of water in the Great Lakes basin. However, we strongly urge that the following Guiding Principles be captured in the study to recognize concerns that CAHI believes must be addressed so that the 'cart is not put before the horse.' It is important that actions taken relative to the 'Clean Farms' initiative be science based with the intent of having effective and efficient collection programs that have identified accountabilities relative to desired outcomes. The Guiding Principles we propose are:

1. There be a science based analysis of the risk to the Great Lakes Basin based on current disposal methods of animal medications and sharps.
2. A baseline of data needs to be established so that a cost/benefit analysis can be conducted that would indicate that by undertaking the collections, improvement to Great Lakes water quality has or will occur.
3. Critical analysis of alternative approaches (e.g. manure management) to waste medication/sharps collection programs needs to be conducted with the view of having a cost effective program that positively impacts the Great Lakes' water quality.

160 Research Lane, Suite 102, Guelph, ON N1G 5B2
Ph: 519-763-7777 Fax: 519-763-7407 Email: cahi@cahi-icsa.ca Website: www.cahi-icsa.ca

4. The collection programs in neither 2008 nor 2009 have clearly defined the target or volume of product to be collected ie. full containers of medications vs. partially used vs. empty containers. Risk assessments need to be conducted relative to the levels of risk of the quantities of product remaining as opposed to virtually empty containers.
5. There are two other sources of livestock medications used in Ontario by animal owners and veterinarians that need to be addressed. They include unlicensed animal medications or bulk chemicals that are used in production. Federal law allows producers to import product for "own-use", and veterinarians are able to prescribe active pharmaceutical ingredients as an alternative to licensed animal medications. A 2006 study conducted by the International Federation for Animal Health, "Benchmarking the Competitiveness of the Canadian Animal Health Industry", estimated that these alternative streams of medication acquisition have been estimated to represent an opportunity cost of up to $100 million (or 1/3) of licensed drug product sales in Canada.

CAHI has developed an industry response to the individual questions you wished to discuss with our members. They are appended to this letter.

Mary, we are concerned about the recommendations that may come forward as a result of the Feasibility Study, not because we do not want or care about being good stewards: importantly, it is because we think there needs to be upfront critical analysis to ensure wise use of taxpayer and industry funds in supporting an outcome based program. The animal health industry does not have the mechanisms to fund in whole or in part those options that have been proposed in the Feasibility Study. Our participation in any future initiatives will also be contingent on the points mentioned above being addressed as well as an equal sharing in the costs by all stakeholders.

Sincerely;

Tracey Firth
Programs Director

c.c. CAHI Board of Directors

Appendix F – Issues Log and Areas for Further Study

1. Volume of Unwanted Product in Ontario

It is unknown how much obsolete product is being stored on Ontario farms and how quickly volumes reoccur. It may be worthwhile to know this to help understand what level of risk it is creating as well as for planning and budgeting purposes for collection and disposal programs.

2. The Risk of Unwanted Pesticides, Animal Health Products and Sharps to the Environment

The risk of these products being released into the environment was not within the scope of this project. It may be worthwhile to complete a scientific risk assessment of these products on the environment to ensure that money spent on collection and disposal programs will benefit the environment.

3. Cost Benefit of Collecting Unwanted Animal Health Products and Sharps

Once the volumes of obsolete products are known and the environmental risks are known a cost/benefit analysis on the collection and disposal of unwanted animal health products and sharps can be completed.

4. Bale Wrap and Other Farm Waste Recycling

Farmers in the focus group felt strongly that bale wrap was a significant "problem" on farm in-so-far as the volume of bale wrap that needs to be disposed of, the lack of recycling options available and that large amounts are being disposed of in an environmentally-harmful manner (e.g. burning). The agriculture industry, bale wrap manufacturers and government should look for solutions to this issue.

5. Traceability of Unwanted Pesticides, Animal Health Products and Sharps

Traceability is a key area of focus to OMAFRA. As both the manufacturing sector and the agriculture sector expands their use of traceability for business improvement, perhaps there would be a need for tracing the movement of these products from the manufacturer to their end use.

Appendix G – Evaluation Criteria for Collection and Disposal Options

The first round of evaluation on the sixteen options used the following criteria to establish scores for each of the options. The six criteria were given equal weight. The statements below the six criteria gave further explanation of the criteria or examples. The steering committee evaluated each option giving it a score of 1 to 5 (1 low / 5 high) for each of the six criteria. The results of the evaluations were tabulated and used for discussion at the working session to come to consensus on which options to continue researching and which options to remove from further discussion.

Meet the Stated Needs
Properly disposes of agricultural waste in an environmentally friendly and sustainable manner
Leads to enhanced protection of water quality of the Great Lakes basin
Have public support particularly rural
Increase protection of farm family health and community public health
Is consistent with the beneficial use of vet meds and pesticides for crop and livestock production
Encourages participation and behaviour change from positive PR and good feeling for doing the right thing for all the players in the industry
Simple for Farmers to Use
Be seen as simple / do-able for both hobby and commercial farmers
Requires little or no desk work. If paperwork – it can be completed in < 30 min. If phone calls are required – one contact centre with reasonable hours
Does not require farmers to drive more than 1 hour each way
Easy for farmers to understand what their responsibilities are
Timing for collections is reasonable for most farmers
Operational Complexity
If new / changed legislation or regulations are required that adds to the complexity
If farmers have to pay up front and then submit an application for a rebate that adds to the complexity
If a major change is required of a funding or administration organization or if a new organization needs to be established this adds to the complexity
The more partners that contribute to the administration the more complex it likely will be
The more physical and monetary steps from the farm to collection to disposal the more complex
Established and Stable within 18 months
Legislation is already in place and does not need to change
Facilities and services exist and do not need to be built or found
Options are available for administration, personnel / contractors can be hired and training easily
Programs can be easily communicated to farmers
Operations are up and running
Operations are stable
Measurable
Can report on how much of each product or product stream is collected
Can measure farmer's satisfaction with the program
Can measure the cost to deliver the program over the amount collected or number of participants
Can report on how much each contributor is paying for the program
Provides required data to help assess if the est. volume of expired product is being reduced and length of time required to remove 80% of expired stocks
Aligned with Government Direction
Support the safety of our food supply

Leads to enhanced protection of water quality of the Great Lakes basin
Promote long term social, economic and environmental sustainability of Ontario
Leverages federal, provincial, local and /or private resources
Promotes / supports a green economy in the province (program develops green technology and innovation)
Provide/promote leadership and innovation of the ag sector

The criteria of frequency, location and cost were used for the second evaluation with the steering committee. Volume, rate of decomposition, safety, rate of recurrence and any cyclical schedule were discussed as factors that would affect the required frequency of collecting and disposing of the unwanted products. On-farm versus off-farm collection requirements were discussed to determine what is necessary for a meaningful program. Relative costs of the remaining options were discussed to further narrow any options that would not be feasible based on cost.

Appendix H – List of Municipalities Contacted

The following municipalities were contacted in this study:

City of Guelph

Wellington County

Chatham Kent

Haldimand Norfolk

Huron County

Region of Waterloo

Bruce County

Durham Region

Peel Region

Price Edward County and the County of Hastings

Simcoe Country

Peterborough County

Middlesex County

City of Ottawa.