Manitoba Agricultural Waste Generation Study

Final Report

March 31, 2011

Executive Summary

At the present time, there are a limited number of systems in place that support the collection, recycling and safe disposal of agricultural wastes generated by Manitoba farmers.

Typical agricultural wastes are managed through a small selection of programs which include options for dealing with rinsed pesticide containers, obsolete pesticide stocks, used oil, filters and containers, and used on-road and off-road tires. While the existing programs have helped provide solutions for some products, there are still a large number of other agricultural waste materials that do not have an environmentally sound „end of life" solution conveniently accessible

The Manitoba Agricultural Waste Materials Generation Study is divided into two separate phases. Phase One aims to quantify and analyze the agricultural waste materials currently being generated on Manitoba farms. Phase Two seeks to evaluate the feasibility of establishing and administering a stewardship program to sustainably mange these materials.

Phase One - Waste Characterization and Analysis

Product	Estimated Volumes	Covered by Manitoba PPP Regulation ?
Greenhouse Film	13.5 tonnes	**No**
Mulch Film	0.4 tonnes	**No**
Silage Film	246.3 tonnes	**No***
Bale Wrap/Bags	160.2 tonnes	**No* – Bale Wrap Yes – Bags**
Plastic Twine	268.5 to 362.5 tonnes	**No***
Net Wrap	118.1 to 128.4 tonnes	**No***
Grain Bags	272.2 tonnes	**No***
Corrugated Cardboard	2,739.5 tonnes	**Yes**
Boxboard	1,023.5 tonnes	**Yes**
Paper Laminates	358.0 tonnes	**Yes**
Feed bags (paper)	179.8 tonnes	**Yes**
Feed bags (poly)	383.6 tonnes	**Yes**
Seed bags (paper)	124.1 tonnes	**Yes**
Seed bags (poly)	46.6 tonnes	**Yes**
Sandbags	8.1 tonnes	**No***

A large number of the surveyed agricultural waste materials are either captured under the Manitoba PPP Stewardship Regulations or in the case of (*) are subject to Ministerial review in order to establish an official position on their status. Of the materials included in this study, it is estimated that there is approximately 6,000 tonnes generated on Manitoba farmswhich could be available for recycling.

Farmers consider responsible disposal of waste to be a highly important issue, with 98% agreeing that the responsible disposal of agricultural waste is very important. Approximately six in ten farmers say they are not comfortable burning or putting certain wastes in the landfill, but don't see an alternative. This seems to indicate a significant level of engagement and concern about this issue. 20% of farmers agree that they are unsure of where or how to dispose of many of the waste materials they generate. .

The following table summarizes the percentage of the waste materials included in this study that are being disposed of by farmers by either burning them, burying them on the farm or taking them to a municipal landfill.

Material Type	Burn	On Farm Burial	Municipal Landfill	Total
Cardboard (Pesticide containers)	53%	0	18%	71%
Cardboard (Other Ag products)	59%	0	18%	77%
Bale/Silage Wrap	66%	0	14%	80%
Ag Twine/Net Wrap	65%	2%	19%	86%
Grain Bags	5%	0	9%	14%
Empty Seed Bags	58%	1%	13%	72%
Empty Feed Bags	57%	0	15%	74%

These responses indicate that, with the exception of grain bags, burning of waste materials is a preferred method of disposal on the farm. Based on the waste materials considered in this report, combined with looking at how these items are disposed of, it appears that a broadly based, wide spectrum, disposal program is urgently needed.

Phase Two – Stewardship Development

Under an Extended Producer Responsibility (EPR) stewardship program, management of agricultural waste materials is the obligation of the brand owners and first importers of these materials into the province of Manitoba.

A typical EPR stewardship plan usually includes the following key items:

- Clear definition of the stewarded product;
- Targets for collection (accessibility and recovery targets);
- Promotion and education for all stakeholders (stewards and consumers);

- Financing by the stewards;
- Reporting of results.

This study has shown that there are collection and processing options available for virtually all of the products identified - no technical barrier exists to manage most of these products. Essentially, all of the key items for an EPR stewardship plan identified above can be addressed. The only challenge in moving forward with a stewardship model is that new infrastructure and new collection programs will be required.

Based on the findings identified in this study, the following recommendations are made:

1. The stewards that fall under the PPP Regulation should be notified that they are required to address their obligations with respect to that regulation;

2. An interpretation should be made, by regulatory authorities, of the application of the PPP Regulation to twine, bale wrap, grain bags and other like products. If the interpretation is that these products are covered by the regulation, then the stewards should be notified of their obligations with respect to that regulation.

3. Consideration should be given to regulation of products not covered under the PPP Regulation, should it be determined that they require better management through recycling and safe disposal.

Farmers and industry stewards in Manitoba have already shown their willingness to participate in responsible waste management. The results of the CleanFARMS empty pesticide container recycling program and obsolete pesticide collection program are a testament to the success that can be achieved when stakeholders work together.

By addressing the recommendations above, the needs of farmers will be addressed and the requirements of industry for a ‘level playing field’ will also be met.

Study Partners

CleanFARMS Inc. has prepared this report with the financial support of:

Manitoba Agriculture, Food and Rural Initiatives
Agricultural Sustainability Initiative

Manitoba Rural Adaptation Council (MRAC)

Manitoba Conservation
Pollution Prevention Branch
Waste Reduction and Pollution Prevention (WRAPP) Fund

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1. Introduction

1.1. Background

At the present time, there are a limited number of systems in place that support the collection, recycling and safe disposal of agricultural wastes generated by Manitoba farmers.

Typical agricultural wastes are managed through a small selection of programs which include options for dealing with rinsed pesticide containers, obsolete pesticide stocks, used oil, filters and containers, and used on-road and off-road tires. While the existing programs have helped provide solutions for some products, there are still a large number of other agricultural waste materials that do not have an environmentally sound „end of life" solution conveniently accessible.

Historically, agricultural plastics and fibre materials have been managed through either on-farm burning or by disposal at the closest landfill site. Neither of these options are optimal, especially when dealing with easily recyclable materials such as those generated on farms. From a cost benefit perspective, the disposal of this agricultural waste represents lost revenue and an unnecessary burden on the natural environment.

A further impetus to the development of alternative agricultural waste management options is the inevitable closing and consolidation of many Manitoba landfills. The province of Manitoba has developed new standards and requirements for landfills that will likely necessitate the introduction of new or increased user fees for larger facilities and also call for the closure of many smaller municipal sites. In the absence of new recycling and diversion alternatives for agricultural waste, illegal dumping and burning of waste materials are likely to occur.

1.2. Project Objectives

The Manitoba Agricultural Waste Materials Generation Study is divided into two separate phases. Phase One aims to quantify and analyze the agricultural waste materials currently being generated on Manitoba farms. Phase Two seeks to evaluate the feasibility of establishing and administering a stewardship program to sustainably mange these materials. These phases are described in detail as follows:

1.2.1. Phase One Objective – Waste Characterization and Analysis

- Develop a comprehensive list of waste paper plastic and other materials currently being generated by Manitoba agricultural producers. This list will include materials which fall under the Manitoba Packaging and Printed Papers (PPP) Stewardship Regulation
- Estimate annual volumes and tonnages of each farm generated waste material
- Determine, quantitatively, how farmers generally dispose of these materials and their current attitudes towards recycling these materials.

1.2.2. Phase Two Objective – Stewardship Development

- Develop a comprehensive list of stewards
- Develop potential stewardship options for managing an efficient transportation, collection and recycling system for materials, including an assessment of:
    - current and future processing options,

- an estimate of the cost of collecting, transporting and processing the recyclable materials in a province-wide program.

1.3. Project Methodology

1.3.1. Phase One Tasks

- Survey Manitoba farmers to identify the range of waste materials generated on-farm.
- Develop an estimate of the annual tonnage and type of farm waste generated for significant farm waste streams.
- Perform a quantitative assessment of how Manitoba on-farm waste materials are currently managed

1.3.2. Phase Two Tasks

- Develop a list of stewards
- Through consultation with key stakeholders and industry experts, develop options for the Manitoba PPP Stewardship Regulation obligated and non-obligated stewards.
- Different options will be assessed and recommendations will be developed as to the best option(s) for each waste class.
- Current material handling practices will be reviewed including:
  - Are the materials identified at the farm level captured under any other current stewardship program?
  - Are the materials likely to be captured under a voluntary industry-led, stewardship group (i.e. empty pesticide container type program)?
  - Is government backstop regulation required for stewardship materials (i.e. similar to existing packages, tires, oil, electronics, etc)?

This information can then be used to understand the infrastructure required to collect and recycle these materials in the agricultural sector. A strategy can then be developed for engaging potential stewards in the sustainable management of the industry‟s by-products.

1.3.3. Communications Methodology

- Key stakeholders will be consulted through:
  - Informal consultations.
  - Formal surveys, interviews and questionnaires.
  - Webinars (as needed).
- The progress of the study and the final report of these activities and their results will be made available as follows:
  - Meetings and interviews with farmers, farm associations, potential product stewards and government regulatory agencies.
  - Publishing of the report on the CleanFARMS website.
  - Electronic distribution of the report to all key stakeholders, and funders.
  - Publishing of the results, highlighting conclusions made and further acknowledgements in “Solid Waste Magazine” in the Spring 2011 edition.

2. Phase One - Waste Characterization and Analysis

2.1. Waste Characterization Study Design

The primary purpose of this study was to quantify certain types of products used in agriculture in Manitoba. Where the methodology provided the opportunity to do so, the manufacturers or importers of these products were identified.

The products investigated include:

- Low density polyethylene (LDPE) #4 plastics used in greenhouse film, silage film and grain bags.
- Twine and mulch film used in commercial horticulture
- Corrugated cardboard, boxboard, paper laminates
- Seed bags, feed bags and sandbags

At the beginning of the project, it was agreed, through consultation with the funding stakeholders, that only the following materials, which are generated on farms in significant volumes, would be included in the study:

- Greenhouse Film
- Silage Film and Bale Wrap
- Grain Bags
- Plastic Twine and Net Wrap
- Mulch Film
- Feed Bags
- Corrugated Cardboard, Boxboard and Paper Laminates
- Seed Bags
- Sandbags

Although there are many other materials included under the Manitoba Packaging and Printed Paper (PPP) Stewardship Regulation, these additional materials are generated in less than significant volumes and are not be included in this study due to difficulties in estimating tonnages and also, that these tonnages would be immaterial to the overall results of the study.

The study used various methods to estimate the quantity of the specified agricultural products used in the province of Manitoba.

- **Literature Review** – A review of existing studies with similar objectives (but conducted in different geographies) provided some metrics which can be applied to this analysis.
- **Internet Searches** – General internet searches provided contact information for domain experts, information on manufacturers and suppliers and some data used to calculate volume estimates.
- **Domain Expert Contacts** – Where possible, the expert advice of individuals who specialized, in particular applications or particular types of plastic, was utilized, e.g. the Greenhouse Specialist for the province of Manitoba was contacted and asked to estimate the amount of plastic film used for greenhouse covers.
- **Industry Contacts** – Major suppliers and manufacturers were contacted by phone or email to solicit their input on estimates of market size.

- **Telephone Survey** – For the three paper waste products and sandbags, a quantitative telephone survey of farmers in the province was conducted. Respondents were asked to estimate the volume of corrugated, boxboard and laminates as well as sandbags which were generated on their farm over the course of an average year. The average value per farm was extrapolated based on census population data to arrive at a provincial estimate.
- **Manufacturers and First Importers** - Major suppliers, retailers and manufacturers were contacted by phone or email to obtain their estimates of market size. In some cases, they also provided information on trends and future developments.

Wherever possible, multiple methods and sources were used in an effort to increase the reliability of the estimate. For example, twine is estimated using forage production values as well as livestock numbers and feeding rates. The estimated range of error for most of the products should be in the range of ±10%-20%.

Detailed calculations on individual material tonnages are included in Appendix A – Manitoba Agricultural Waste Characterization Study (pgs 22-24).

2.2. Results of the Waste Characterization Study

One of the primary purposes of this study is to estimate the quantity of the different waste agricultural materials that are profiled in this report.

2.2.1. Greenhouse Film

To assess the potential annual volume of greenhouse film available for recycling on an annual basis, the Provincial Greenhouse Specialist for Manitoba was interviewed and confirmed an estimate of 3.5 million square feet of plastic used to cover greenhouses in the province. When converted to weight using a factor provided by a major manufacturer of greenhouse film, this represents 54.1 tonnes of total use. Unless it is damaged by extraordinarily severe weather, this plastic film is usually replaced every four years. Therefore the maximum total of this type of film plastic available for recycling annually is estimated to be 13.5 tonnes.

2.2.2. Silage Film and Bale Wrap

Silage Film
The estimated volume of plastic silage film has been calculated as a factor of the total number of cattle in Manitoba. These values were obtained from Statistics Canada. The population of cattle was separated based upon 10% beef and 90% dairy cattle being fed silage, per livestock extension staff estimates. The remainder of each segment is fed a ration based on baled forage or straw.

Average feeding rates supplied by the same sources were then applied to the number of cows in order to arrive at an estimate for the volume of feed consumed. Two ratios were then used to forecast film use per tonne of silage, and were obtained from a previous in depth study on silage film use. These ratios were used to calculate a range for the total silage film used in the province on an annual basis. The resulting estimated volumes range from 246.3 tonnes to 439.8 tonnes per year.

These estimates were then reviewed with a major manufacturer of silage film for the Manitoba market who declined to provide a specific estimate of the size of this market, however did indicate that their estimate of the total silage film use in Manitoba fell very close to the lower of

the two estimates calculated. This lower value is what is utilized in this study for modeling purposes.

Bale Wrap
Several different industry sources estimate that between 20%-30% of the forage production in Manitoba is baled or wrapped. The lower value of 20 percent was used and applied to Statistics Canada"s most recent data for provincial forage production to arrive at an estimated of 160.2 tonnes per year. This estimate was then validated by a major manufacturer of these products.

2.2.3. Grain Bags

Grain bag usage was observed to be heavier in the western areas of Manitoba than in the eastern agricultural regions of the province as a result of the concentration of larger grain producing operations in that area of the province. Grain bag sales have increased significantly over the last five years as these larger grain producers have realized noticeable reductions in storage and handling costs from their use.

Consequently, due to the recent growth in this usage production, survey results have been solely derived from industry based sources due to a lack of current or available independent statistical measures of this material"s usage.

The estimate of 272.2 tonnes is an average of sales at the retailers interviewed multiplied by an estimate of the total number of grain bag retailers in the province. The estimate of the market size was considered realistic by one of the largest manufacturers of this product.

It should be noted that some retailers in Saskatchewan are selling and shipping small quantities of grain bags direct to farmers in Manitoba and that the estimate in this report does not account for this out of province sourcing.

2.2.4. Plastic Twine and Net Wrap

Estimated volumes for plastic bale twine and net wrap have been calculated in two ways. The first is based on the total number of cattle in Manitoba based on Statistics Canada data. This data indicated that approximately 90% beef and 10% dairy cattle baled feed. The remainder of each segment is fed a ration based on silage.

Livestock specialists provided average annual feeding rates which were then applied to the number of cows to arrive at an annual volume of feed consumed. Several ratios for the volume of twine and net wrap used per tonne of forage and straw were then used to calculate a range for the total annual provincial usage of these materials. These values indicated an annual usage range of 268.5 tonnes to 333.4 tonnes of twine and approximately 118.1 tonnes of net wrap. This method does not account for the much smaller livestock sectors such as horses, sheep or bison.

A second method for estimating these products is to apply the average use rates of twine and net wrap to the total forage production values as published by Statistics Canada. This resulted in values which were slightly higher than produced by the previous method, at 292.0 tonnes using retailer estimates to 362.5 tonnes using custom baler estimates. Net wrap estimates were slightly higher also at 128.4 tonnes.

For the purposes of this report, the lower estimates have been used for further discussion and modeling calculations

2.2.5. Mulch Film

The Provincial Specialist, Fruit Crops for Manitoba provided an estimate of the amount of plastic mulch used on fruit crops in the province. The majority of this product is used on strawberries and saskatoons. These crops are perennial and mulch is only applied in the year of establishment. As a result, annual use rates vary with the number of new acres of each of these crops planted each year.

Over the past 5 years on average, a maximum of 10 acres of saskatoons is established each year. Use in strawberries is quite low with an estimated annual use of 2 acres per year. Once these acreage values are adjusted for the percentage of the total field area covered by mulch, the average annual use rate for plastic mulch is estimated at 0.4 tonnes.

Current practice in fruit crops is to allow the mulch to degrade over time. It is uncertain whether producers would remove the mulch after the establishment year of the crop if a recycling option was made available to them.

Some of the larger vegetable growers in the province were contacted to determine if plastic mulch is a common production practice in any vegetable crops. All of the growers indicated that there had been some experimental use of plastic mulch in the past. However, all of the growers contacted had discontinued this practice.

2.2.6. Feed Bags

Two methods were used to obtain estimates of the annual volume of feed bags generated in the province of Manitoba. The first estimate was supplied by a packaging manufacturer who supplies a number of the feed companies. The manufacturer indicated that the Manitoba feed market requires between 500,000 to 600,000 paper bags per year. Usage rates for poly bags were indicated to be in the range of 750,000 to 1 million bags per year.

The second technique was to estimate the number of feed bags based upon information provided by representatives of feed mills in Manitoba. Mills were asked if they produced bagged feed on a regular basis, what type of bags they used and their opinions on the total number of bags used in the province. Extrapolated figures, based upon Mill estimates, indicate that the total bags used, would be in the range of 1.8 million bags per year. Industry consultation supported this estimate as a reasonable volume.

Based upon usage ratios and bag weights the volume of paper feed bags were at 179.8 tonnes and the poly feed bags were estimated at 383.6 tonnes.

2.2.7. Corrugated Cardboard, Boxboard and Paper Laminates

A quantitative survey of farmers was conducted to provide an estimate of corrugated cardboard, boxboard and paper laminates generated on farms in Manitoba. This methodology was required

because these by-products are generated from a wide variety of sources, and would have been impractical to assess using the industry interview methodology.

The survey resulted in the following estimates of annual volume:

- Corrugated cardboard – 2,739.5 tonnes
- Boxboard – 1,023.5 tonnes
- Paper Laminates - 358.0 tonnes

Since a primary research methodology (farmer survey) was employed to determine available volumes for these products, suppliers interviews were not used as has been done with other streams covered in this report.

2.2.8. Seed Bags

The process for estimating the volume of seed bags began by establishing the relationship between the different acreage of major crops grown in the province and the average seeding rate relative to each of the crops in order to determine the total amount of seed used in Manitoba. These figures were then used to estimate the retail volume of seed for each crop. (It is assumed that when growers do not use certified seed the bin run seed is handled in a bulk form.)

Seed retailers were then contacted in order to establish an estimate of the percentage of bulk seed versus bagged seed, on a „per crop" basis. Retailers were also consulted to identify whether poly or paper bags were commonly used for each seed type.

The above process produced estimates of 124.1 tonnes of paper bags and 46.6 tonnes of poly or plastic bags used by the seed trade in Manitoba on an annual basis. It should be noted that this estimate does not include bags used in the production of seed. Seed growers take very small amounts of breeder seed and over the period of several years, multiply these small amounts of seed into the large volumes of certified seed used by commercial farmers. Because the seed volumes are smaller than on a commercial production farm and because of the need to eliminate contamination, bags are much more prevalent on a seed farm versus a commercial farm. It can be assumed that while this use is intensive, the source would amount to a small percentage of the volume of bags generated by commercial farm operations.

2.2.9. Sandbags

Sandbags volumes were assessed by surveying geographically dispersed farmers who were asked how many sandbags were used on their farm on an average year. Their responses, when factored over the total number of farms in the province and an average weight per bag, indicated a total volume estimate of approximately 8.1 tonnes per year.

A second approach was employed which focused on farms in regions where flooding occurs, which is mostly in certain low-lying areas of the province. It was discovered that many farmers utilized sandbags supplied by the local Rural Municipality (RM). A major, long-term supplier of sandbags to the RMs confirmed that only half the RMs in the province order sandbags on a regular basis and estimated that on average these RMs order 5000 new sandbags per year.

The weight using this estimating method was 6.4 tonnes (relatively close to the survey estimate).

2.2.10. Waste Characterization Volume Summary from the Farmer Survey

The study estimates that approximately 6,000 tonnes of the waste agricultural materials are generated annually on farms. The following charts summarize the findings broken down by material categories:

Product	Estimated Volumes	Covered by Manitoba PPP Regulation ?
Greenhouse Film	13.5 tonnes	**No**
Mulch Film	0.4 tonnes	**No**
Silage Film	246.3 tonnes	**No***
Bale Wrap/Bags	160.2 tonnes	**No* – Bale Wrap Yes - Bags**
Plastic Twine	268.5 to 362.5 tonnes	**No***
Net Wrap	118.1 to 128.4 tonnes	**No***
Grain Bags	272.2 tonnes	**No***
Corrugated Cardboard	2,739.5 tonnes	**Yes**
Boxboard	1,023.5 tonnes	**Yes**
Paper Laminates	358.0 tonnes	**Yes**
Feed bags (paper)	179.8 tonnes	**Yes**
Feed bags (poly)	383.6 tonnes	**Yes**
Seed bags (paper)	124.1 tonnes	**Yes**
Seed bags (poly)	46.6 tonnes	**Yes**
Sandbags	8.1 tonnes	**No***

** these materials are subject to ministerial interpretation since they are sold as a product, but are used as a package. As such they may be subject to to the Manitoba PPP Stewardship Regulation*.

Table1: Waste Characterization Volume Summary

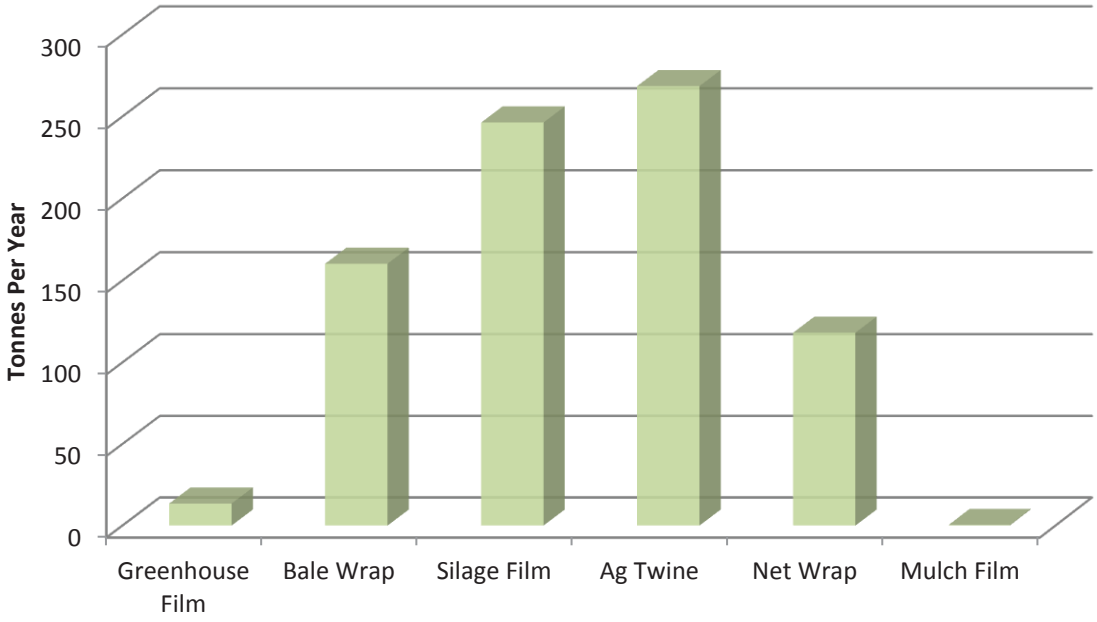

Chart 1: Manitoba Agricultural Plastics

Plastics such as bale wrap, silage film, twine and net wrap represent significant opportunities to divert easily recoverable plastic waste from landfill and other less than optimal destinations.

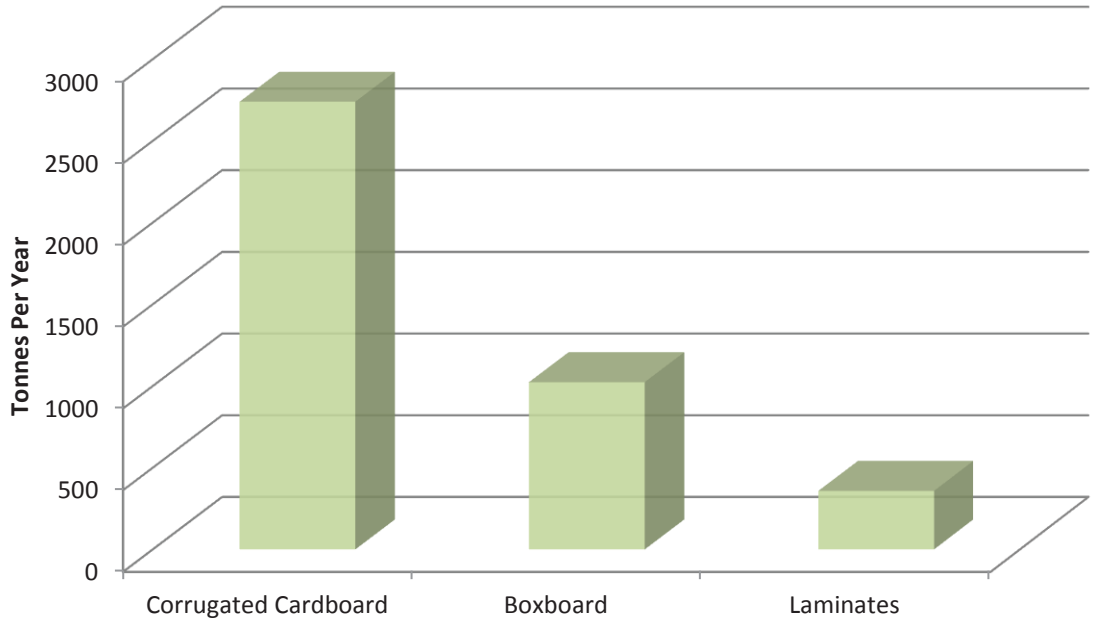

Chart 2: Manitoba Agricultural Fibre

Corrugated cardboard and boxboard are commonly recycled and are easily collectible and recoverable.

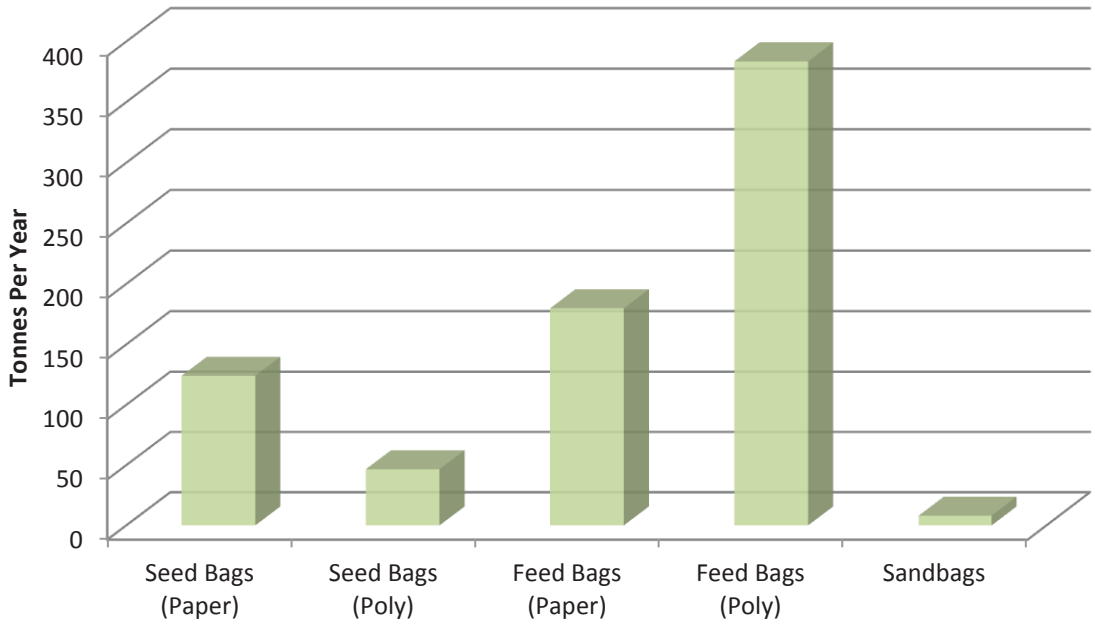

Chart 3: Manitoba Miscellaneous Agricultural Materials

Feedbags and seed bags may require separation prior to recovery, however individually they still represent significant volumes of potentially recoverable material.

The detailed methodology and results of the study are presented in Appendix A: Manitoba Agricultural Waste Characterization Study, attached.

2.3. Results of the Farmer Survey

In November of 2010, a quantitative telephone survey of Manitoba farmers was carried out to determine:

- how many of the common agricultural wastes are being generated on the province"s farms;
- how farmers are currently disposing of these wastes;
- the attitudes of farmers towards the management of agricultural wastes in general; and,
- how they are most likely to find out about diversion programs and where they would look for resource information.

The survey targeted a random sample of 300 farmers, distributed across all growing areas of Manitoba, and weighted to reflect the actual distribution of farms based on 2006 census data.

2.4. Common Agricultural Site Generated Wastes

The January 2011 Farmer Survey results validate the list of commonly accepted, available streams targeted in this Waste Characterization Study of on-farm waste materials. Chart 4 represents the proportional percentage of farms which generate each of the indicated

agricultural waste streams. It is not intended to reflect on overall volumes of wastes; however, it does provide a significant indication that there are multiple waste streams being generated across many farms. The implication of this broadly based generator profile is that any effective solution for managing these various waste streams will require a robust design with the ability to address most, if not all, of these materials.

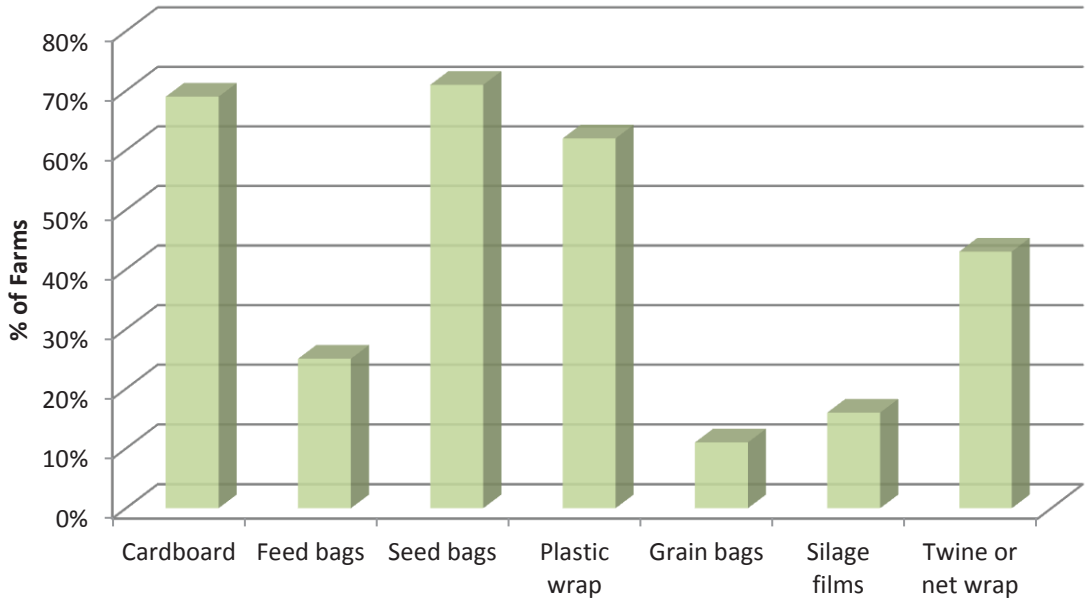

Chart 4: Proportional Generation of Farm Wastes

2.5. Current Disposal Methods for Agricultural Waste

The following table summarizes the percentage of the waste materials included in this study that are being disposed of by farmers by either burning them, burying them on the farm or taking them to a municipal landfill.

Material Type	Burn	On Farm Burial	Municipal Landfill	Total
Cardboard (Pesticide containers)	53%	0	18%	71%
Cardboard (Other Ag products)	59%	0	18%	77%
Bale/Silage Wrap	66%	0	14%	80%
Ag Twine/Net Wrap	65%	2%	19%	86%
Grain Bags	5%	0	9%	14%
Empty Seed Bags	58%	1%	13%	72%
Empty Feed Bags	57%	0	15%	74%

Table 2: Current Agricultural Disposal Practices

These responses indicate that, with the exception of grain bags, burning of waste materials is a preferred method of disposal on the farm.

Based on the waste materials considered in this report, combined with looking at how these items are disposed of, it appears that a broadly based, wide spectrum, disposal program is urgently needed.

While the survey did indicate a high rate of reuse of grain bags, it should be noted that these are a relatively new product to farms in Manitoba. Reuse of the bags are being done in the form of replacement of silage and bin covers and storage on the farm for some type of use later. Effectively, all of the used grain bags will still require disposal at some time in the future, even if they are used for a different purpose for now.

2.6. General Farmer Attitudes Towards the Management of Agricultural Wastes

Farmers consider responsible disposal of waste to be a highly important issue, with 98% agreeing that responsible disposal of agricultural waste is very important (79% strongly agreeing).

Approximately six in ten farmers say they are not comfortable burning or putting certain wastes in the landfill, but don't see an alternative. This seems to indicate a significant level of engagement and concern about this issue. 20% of farmers agree that they are unsure of where or how to dispose of many of the waste materials they generate. There was also no apparent difference in these attitudes, based on region, farm size or type of farm.

While a high portion of farmers generally agree that the agricultural industry is doing enough to ensure that there are responsible ways to dispose of their products, agreement is “moderate” with 42% strongly agreeing and 42% somewhat agreeing. This high proportion of agreement does appear to contrast strongly with the high proportion of farmers who burn or bury on-farm site and the 59% of the farmers who agree that they are uncomfortable with these materials disposal practices.

Of particular note is that farmers return their empty pesticide containers more than 90% of the time when the distance they need to travel to a collection site is less than 25 kilometres, but return rates decrease when sites are further away from the farms. This has significant implications for any future plans to establish a province-wide collection network for the other agricultural wastes included in this study.

2.7. Communications

When farmers were asked where they are most likely to find out about recycling or safe disposal programs, the most common responses were: farm newspapers 54%, radio 23%, and brochures/flyers 16%.

When farmers were asked to rate the usefulness of a list of information sources, farm newspapers and magazines were most highly rated at 80% agreement, followed by crop input

retailers at 70% and other farmers are also seen to be a useful source of information at 63% agreement.

There are only a few differences between segments in ratings of the usefulness of the information sources, such as the larger the farm, the higher they rate the usefulness of trade shows and those in the larger acreage categories are more likely to consider online websites to be somewhat or very useful.

The development of these effective communication channels will be critical to establishing program awareness and the adoption of new materials management practices.

The complete survey results are presented in Appendix B - BlackSheep Strategy: CleanFARMS Manitoba Farmer Survey, Final Report, January 26, 2011, attached.

2.8. Waste Characterization Analysis Summary

The waste characterization analysis shows that the vast majority of products generated on the farm are fibre-based packaging, film and twine. A number of these materials fall within the definition of packaging, as it is used in the PPP Stewardship Regulation, while a remaining number remain subject to Ministerial interpretation. Additional packaging materials that are generated on the farm include various bags from feed, seed and grain handling uses. These bags are a collection of plastic, paper and „laminate" bags.

The stewards of the packaging materials are covered under the current PPP Stewardship Regulations and it is recommended that they should be approached to determine the best method for packaging materials collection and processing. It should also be noted that processing arrangements already exist for many of these identified materials.

There are currently no regulations in place for other non-packaging waste products, however, these materials do represent a significant portion of products that could be captured for recycling, given that a number of solutions already exist for their collection and processing.

The previously discussed research has indicated that agricultural sites generate significant volumes of recyclable materials and is a noticeably underserviced generator segment in the province. Fortunately, farmers have demonstrated an awareness of this situation, a desire to „do the right thing" and the required willingness to make a change in their behaviours once the appropriate solutions have been made available.

3. Phase Two – Stewardship Development

Stewardship program development requires a number of key components in order to maximize the potential for success. An effective program requires:

- the identification of a robust list of stewards
- the development of a strong impetus to promote participation
- the design of an efficient collection process – sustainable, broadly based
- the design of a cost effective collection and processing system

While the above list is not intended to be a comprehensive summation of key success factors of a stewardship program, the components indicated are critical to an easily administered, sustainable and cost effective Extended Producer Responsibility program.

3.1. Potential Stewards as Identified During the Waste Characterization Study

The lists of manufacturers, first importers and retailers included in this report was compiled through internet searches, discussions with those contacted to supply data for this research and from existing documentation.

3.1.1. Greenhouse Film

Suppliers, manufacturers and distributors of greenhouse film documented during research are as follows:

The Professional Gardener Co.
Tom Wright
Beatty, SK
306-752-4150

Westgro Horticultural Supply Inc.
1557 Hastings Cresent S.E.
Calgary, AB T2G 4C8
800-661-2991

HJS Wholesale Ltd.
330 Transport Road
Winnipeg, MB R2C 2Z2
204-668-8360

AT Films Inc.
4605-101 Avenue
Edmonton, AB T6B 3R4
780-450-7760

Growers Requisites
1915 Setterington Drive
Kingsville, ON
519-326-4466

Northern Greenhouse Sales
Box 1450
Altona, MB R0G 0B0
204-327-5540

3.1.2. Silage Film and Bale Wrap

AT Films Inc.
4605-101 Avenue
Edmonton AB T6B 3R4
780-450-7760

Farmer"s Sealed Storage
#3, Unit 5 Industrial Park Rd.
South Gower Business Park
Kemptville, ON K0G 1J0
613-258-9818

Dubois Agrinovation
478, Notre-Dame,
Saint-Remi PQ J0L 2L0
450-454-3961

Up North Plastics
Cottage Grove, Minnesota
651-734-6000

3.1.3. Grain Bags

PowerFill
5015-45 Ave
RR#1, SITE 19, Box 2
Millet, AB T0C 1Z0
780-387-3600

AT Films Inc.
4605-101 Avenue
Edmonton, AB T6B 3R4
780-450-7760

Canadian Hay and Silage Limited
R.R.1, Bowden, AB T0M 0K0
403-224-2072

Amity Ag
780-348-5355

Grain Bags Canada
Lake Lenore, SK S9K 2J0
306-682-5888

Gem Silage Products
403-342-7522

3.1.4. Plastic Twine and Net Wrap

PowerFill
5015-45 Ave, RR#1, SITE 19, Box 2
Millet, AB T0C 1Z0
780-387-3600

Federated Cooperatives
401 22nd St E
Saskatoon SK, S7K 0H2
306-244-3311

Canadian Hay and Silage Limited
R.R.1, Bowden, AB T0M 0K0
403-224-2072

Amjay Ropes & Twines Ltd.
Newmarket, ON
905-830-6755

Donaghy's
Nobleford, AB
403-795-7062

Bridon Cordage Ltd.
Saskatoon, SK
306-652-4133

Syfilco Ltd.
320 Thames Rd. E.
Exeter, ON N0M 1S3
519-235-1244

Tama Canada Ltd.
50 Dundas Street East-Ste 200,
Dundas, ON L9H 7K6
905-690-4442

3.1.5. Mulch Film

Dubois Agrinovation
478, Notre-Dame,
Saint-Remi PQ J0L 2L0
450-454-3961

Robert Marvel Plastic Mulch
2425 Horseshoe Pike (Rt. 322)
Annville, PA 17003

The Professional Gardener Co. Ltd.
915-23 Ave S.E.
Calgary, AB T2G 1P1
403-263-4200

Plastitech Inc.
478 Notre-Dame, C.P. 750
St-Remi, Quebec J0L 2L0
Toll Free: 800-667-6279

Climagro Mulch Film, LECO Industries
3235 Sartelon
St-Laurent, PQ H4R 1E9
800-561-8029

HJS Wholesale
330 Transport
Winnipeg, MB
204-668-8360

Evenspray
2-851 Lagimodiere Blvd.
Winnipeg, MB R2J 3K4
204-237-9095

Westgro Horticultural Supply Inc.
1557 Hastings Cresent S.E.
Calgary, AB T2G 4C8
800-661-2991

Rochelle Plastic Film
P.O. Box 606
Rochelle, IL 61068

Mechanical Transplanter Co.
1150 Central Ave.
Holland, MI 49423
616-396-8738

Pliant Corp.
1515 Woodfield Rd. Suite 600
Schaumburg, IL 60173
866-878-6188

Ken-Bar Inc.
25 Walkers Brook Drive
Reading, MA 01867-0704
781-944-0003

Ag Resources Inc.
35268 State Highway 34
Detroit Lakes, MN
218-847-9351

Jefferies Nurseries
Portage la Prairie, MB

3.1.6. Feed Bags

St Boniface Bag
426 Goulet St,
Winnipeg, MB R2H 0S6
204-237-8510

Provincial Paper & Packaging
6935 Davand Drive,
Mississauga, ON L5T 1L5

Continental Industrial Products
173 Woolwich ST, Suite 203
Guelph, ON N1H 3V4
519-837-9720

Hood Packaging Corporation
5615-44 Street S.E.
Calgary, AB T2C 1V2
403 279 4000

3.1.7. Corrugated Cardboard, Boxboard and Paper Laminates

Corrugated cardboard, boxboard and paper laminates are generated through a wide variety of packaged products utilized on agricultural sites and is difficult to quantify using the industry interview methodology of the Waste Characterization Study.

Potential stewards include all suppliers of materials which include corrugated cardboard, boxboard and paper laminates packaging.

3.1.8. Seed Bags

Manyan Inc.
2611 Leger
LaSalle, PQ H8N 2V9
514-364-2420

St Boniface Bag
426 Goulet St,
Winnipeg, MB R2H 0S6
204-237-8510

3.1.9. Sand Bags

St Boniface Bag
426 Goulet St,
Winnipeg, MB R2H 0S6
204-237-8510

Endurapak
311 Alexander Avenue
Winnipeg, MB R3A 0M9
204-956-3075

3.2. Current Stewardship Programs in Manitoba

Currently the province of Manitoba has a series of programs in place which are designed to administer and finance environmentally sound end-of-life management of waste materials. The following table summarizes existing provincial programs, some of which target materials generated on farms in the province. Some of these programs are voluntary rather than mandatory.

Material	Stewardship Organization	Collection	Financing
Packaging and Printed Paper Materials, including boxboard, cardboard, paper laminates, newspapers and magazines, containers, aluminum cans etc.	Multi-Materials Stewardship Manitoba (MMSB)	Material is collected through a municipal curbside collection system and through some municipal depots in smaller communities	20% of net costs are covered by municipalities, and 80% of net costs are covered by stewards
Scrap Tires	Tire Stewardship Manitoba	Material is brought to collection sites by users	Consumers are charged an advanced disposal fee (ADF) on their tire purchase which is used to finance the program.
Used Oil, Oil Filters and Containers	Manitoba Association for Resource Recovery Corporation	Material is brought to collection sites by users	Financed by stewards and usually passed on to the consumer.
Prescription drugs, such as antidepressants, pain medications or blood pressure medicine in pill, capsule, liquid or cream. VOLUNTARY	Post Consumer Pharmaceuticals Stewardship Association	Material is brought to pharmacies by users	Financed by product stewards
Rechargeable batteries and cell phones. VOLUNTARY	Call2recycle	Material is brought to collection sites and retailers by users	Financed by product stewards
Obsolete Pesticides and Empty Pesticide Containers. VOLUNTARY	CleanFARMS™	Material is brought to collection sites by users where it is prepared for safe disposal (obsolete pesticides) or recycling (containers)	Financed by product stewards

Table 3 - Existing Programs

There are also new regulations for wastes such as household hazardous material waste and electronic waste. The following table illustrates some materials that fall under provincial regulations and the organizations that have proposed stewardship plans to manage them.

Material	Stewardship Organization	Collection	Financing
Paints, fluorescent lamps and compact fluorescent bulbs	Product Care	Plan awaiting approval	Plan awaiting approval
Waste electronics and electrical equipment		Plan awaiting approval	Plan awaiting approval
Mercury-containing thermostats	Summerhill Group – Switch the „stat	Plan awaiting approval	Plan awaiting approval
All batteries	Call2recycle	Material is taken to collection sites by users	Financed by product manufacturers
Automotive antifreeze	Manitoba Association for Resource Recovery Corporation	Plan awaiting approval	Plan awaiting approval
Pharmaceuticals	Post consumer Pharmaceutical Stewardship Association	Plan awaiting approval	Plan awaiting approval

Table 4 - Proposed Stewardship Programs

3.3. Stewardship Options

There are several options for a stewardship program to manage the wastes produced on Manitoba farms. While all of the following options have a similar end goal; which is to encourage and support the achievement of effective environmental stewardship within a specific category of agricultural wastes, there are notable differences such as the level of user commitment, strength of motivational factors, and legislative support.

3.3.1. Mandatory Option

A mandatory legislated program would cover products not currently under the PPP regulation such as twine, bale wrap and grain bags. (Packaging materials are already covered by the PPP Stewardship Regulation). A mandatory option would obligate all product “stewards” (generally defined as brand owners or first importers) to develop and finance a waste management plan. Stewards may opt to internalize these costs into their product price or may choose to apply the cost on a unit basis at the point of sale (similar to the “eco-fees” being charged in Manitoba on items like tires, motor oil, and oil filters).

For this option, an organization such as CleanFARMS could represent the stewards and act as the central „clearinghouse" for program management, funds distribution, accountability and reporting.

Mandatory EPR programs have an increased success rate when they are supported by other policy instruments such as eco labelling on packaging and disposal/burning bans for the waste products.

This option has the highest likelihood of success since it ensures that there are sufficient funds available to operate a cost effective program for the collection, transportation and recycling/disposal of the waste materials. Furthermore, since all stewards are obligated to pay their „fair share" into the program, no producer can have an unfair advantage in the marketplace by choosing to opt out. However, selection of this option may require some higher level cooperation with Saskatchewan, should that province choose the voluntary option for its steward model (i.e. to avoid the cross-subsidization of the complementary programs).

A mandatory program may also attract the participation of non-obligated stewards since they may not want to publicly appear to be "uncommitted" to sound environmental management principles through a lack of participation.

3.3.2. Voluntary Option

An alternative to a mandatory stewardship program is one that is completely voluntary. Again, an organization like CleanFARMS could design and operate a collection program for any number of designated waste agricultural materials. The program would be paid for with fees charged to producers who agree to act as „stewards" voluntarily.

A voluntary program could be implemented in stages where it would begin with some of the designated materials and then phase in the others over time. The advantage of creating a staged program in this fashion is that it would allow the stewards to put the infrastructure in place to collect, transport, process and establish recycling markets for the initial materials, and then phase in others as the program grows.

In the case of a voluntary program, it may be even more important to support the plan with policy instruments such as eco labelling and bans on improper disposal in order to increase the chance of program success.

With a voluntary program, industry is able to design the program the way they want with limited prescriptive legislated requirements. This can reduce the overall cost for stewards by minimizing the monitoring and reporting requirements of the program. However, it should be noted that some producers may choose to opt out of this type of program, which would have the effect of creating an unfair economic disadvantage for those that decide to participate. This may be one of the key drivers behind the mandatory legislative requirements of many of the Canadian stewardship programs.

3.3.3. Ban Only Option

In Germany, landfilling of all agricultural wastes is banned and, while incineration of these materials is theoretically an option, it is prohibitively expensive (i.e. tipping fees can reach levels of over $250 CAN per tonne). Consequently, there are strong incentives to put stewardship programs in place to collect these materials and maximize the quantities that are either recycled or disposed of in a manner so that incineration becomes the disposal approach of „last resort".

The challenge with a landfill ban is that it requires both public and political support to make this option a key policy instrument. A ban must also be enforced in order to be effective. The geography of Manitoba and the effort required to enforce a ban at hundreds of landfill sites, make this particular policy option very difficult to implement. However, it can be used as a component of a longer term strategy to deal with agricultural waste.

3.4. Collection Options

A total of seven potential options have been developed for the collection of the waste agricultural materials discussed in this study. These options are not mutually exclusive, and in fact, could be most efficient when utilized in combination with each other.

3.4.1. Option 1 - Municipal Collection Sites

There are approximately 100 municipal sites across the province that CleanFARMS has successfully used for more than 20 years for the collection of empty pesticide containers.

As shown in Appendix D - Manitoba Municipal Landfill Sites Used for Empty Pesticide Container Collection, these sites provide broad geographic coverage and a large percentage of farms are less than 25 kilometres from a site. Many farmers visit these sites on a regular basis since they typically accept many other waste materials in addition to pesticide containers. This option may be less convenient for farmers than „return to retail", but it is clearly one that they are very familiar with.

The majority of these sites have the space required to accept and segregate the different categories of agricultural wastes for subsequent pickup. Most are readily accessible by truck all year round, but there are some that can be difficult or impossible to access in the spring due to flooding or in the fall if precipitation levels are high.

There have been indications that the province may be planning to close a number of the municipal sites in the future. Should this occur, the farmers affected by a site closure will be forced to drive a greater distance to the next closer site or find less ideal means of managing their waste material. As mentioned in Section 3.3, farmers appear to be less likely to drop wastes off at a municipal site when the distance they need to drive exceeds 25 kilometres.

3.4.2. Option 2 - Return to Agri-Retailers

This approach has been proven effective, by the successful collection of empty pesticide containers by CleanFARMS, in Saskatchewan, for more than 20 years.

Appendix E shows the locations of the approximately 100 Manitoba agricultural retailers that are members of the Canadian Association of Agri-Retailers (CAAR). If all of these locations were used as collection points for waste agricultural materials, they would provide geographic coverage similar to the existing municipal sites. However, the distribution map in Appendix F does indicate that these sites tend to be more concentrated (i.e. multiple retailers in the same community) and also shows that in some parts of the province there is a local municipal site, but no CAAR member retailer. It should be noted, however, that not all agri-retailers are members of CAAR and not all agri-retailers sell the same products. As such a return to retail option will need to be explored carefully so as to ensure all retailers are considered.

Since farmers are already going to one or more retail sites during the year with some degree of regularity, the inclusion of these sites in a collection model would be an added convenience, and would likely result in increased program participation and higher diversion rates. If farmers could drop off agricultural waste materials at the same time as they are picking up supplies, they could avoid a separate trip to their local municipal site.

The participation of retailers in a collection network of this type would need to be voluntary and may even require some type of financial incentive in order to encourage their involvement. It should be noted that not all retailers will have the external space required to collect the different materials and keep the different streams segregated for pickup, while others may object to collecting materials that they do not sell (i.e. a feed retailer might only agree to take back empty feed bags). Additionally, some may simply not have the manpower required to take on the additional work associated with collection and storage of these materials.

3.4.3. Option 3 - Mixed Model (Municipal and Agri-Retailer Sites)

Municipal landfills or retail sites could form the basis for a reasonably efficient collection system. However, many of the disadvantages associated with these options could be eliminated or minimized by developing a collection infrastructure that includes an ideal combination of both of these types of sites. Since the primary criteria for a collection system should be to maximize the convenience for farmers (and therefore the likelihood that they return their agricultural wastes), this option appears to be the best suited to meeting this goal.

The main advantages of this model are:

- Improved access/convenience for farmers
- Allows for the reduction in the number of municipal sites over time
- Allows for the increase in the number of retailers participating voluntarily over time
- Retailers are less likely to feel „pressured" to become a collection location
- Provides the flexibility to have the most appropriate return location for certain waste materials

The only notable disadvantages of this model are that the total collection and transportation costs may be higher and, retailers who participate in the program may have an unfair advantage over those who do not (i.e. in some cases, farmers may start doing business with a different

retailer in his area because he can drop off waste materials and make purchases during the same visit).

3.4.4. Option 4 - Single Stream Collection Blitz

This option would entail the collection of just one of the waste materials at specified locations and times of the year. This is the method that CleanFARMS has used for many years for the collection of obsolete pesticide stocks in all Canadian provinces. It is also the method that a group of Saskatchewan farmers used to collect approximately 25 tonnes of grain bags in the Moose Jaw area in 2010.

This option is best suited for the collection of bulky materials that are normally generated at only certain times of the year and can be easily stored on the farm during the interim period. Since it would be difficult, if not impossible, for a municipal site or retailer to deal with empty grain bags on a regular basis, this is probably the option that should be considered for collecting these bags in the short to medium term.

For this option to be effective, the collection sites chosen need to have the appropriate amount of space required to handle the returned volumes. Also, organizers need to be aware that blitzes can result in the return of more material than can be properly managed at any one site, on a given day.

3.4.5. Option 5 - Combined Stream Collection Blitz

This option uses the same general approach as the single stream blitz, but in this case farmers would be allowed to return multiple waste materials at the same time rather than just one. The designated collection point could be a municipal site, an agricultural retailer or an alternative type of site with a suitable amount of space and convenient access for local farmers.

This approach might only be used in conjunction with grain bag collection blitzes to spread some of the fixed costs of managing the blitz over a broader amount of material.

3.4.6. Option 6 - Mobile Farm Pickup

This option would allow farmers to have their various agricultural wastes picked up by a private contractor and this service could be provided „on-demand" or on a scheduled basis.

This model is used in both New Zealand and the United Kingdom for the collection of pesticide containers, bale and silage wrap and plastic twine. The farmer typically pays the collection company a fixed amount per pickup and is free to utilize this service as frequently, or as infrequently, as they choose.

The model would be very convenient for farmers. However, using this approach for the approximately 19,000 farms in Manitoba, under a „steward pays" model (the most likely scenario), could be prohibitively expensive compared to any of the other options.

3.4.7. Option 7 - Mobile Farm Pickup (via Reverse Distribution)

This is similar to the previous option, but in this case the companies delivering certain products directly to the farm would collect some agricultural wastes at the same time. For example, a company that delivers feed and/or seed could possibly collect the farmer"s empty bags and return them to a centralized warehouse for consolidation and eventual return to a designated location.

While convenient for farmers, this option has a number of disadvantages:

- it is very unlikely that all of the agricultural wastes could be picked up in this manner;
- the waste products are not necessarily available at the same time as the new product delivery;
- companies may be unable to accommodate the waste materials with their existing delivery trucks;
- companies are likely to require some type of financial incentive to participate;
- companies are unlikely to want to mix possibly dirty and bulky waste materials with the clean product, remaining on the truck.

3.5. Processing Options for Waste Agricultural Materials

While it is critical to the stewardship model to design a system which can effectively gather the largest volume of agricultural waste materials in the most efficient and effective manner, the system will fail if there is not cost effective access to end markets which can reclaim and recycle these agricultural wastes and close the loop on the "cradle to cradle" cycle. The following discussion seeks to determine if there are existing recyclers or processors for the different waste materials streams, if there is sufficient processing capacity for recyclable materials in the market, and what are the potential net revenue (or cost) associated with managing these materials.

Various methods were used to collect this information and include the following:

- contacting existing processors in Canada and the US directly,
- contacting companies who are currently recycling materials similar to those covered in the study in order to develop a sense of future processing plans,
- performing internet searches, in order to identify existing or potential recyclers of any of the waste materials and also identify other jurisdictions with farm waste recycling programs, and,
- literature reviews.

3.5.1. Corrugated Cardboard

Corrugated cardboard (OCC) is a material that has been recycled in North America for as long as residential recycling programs have been in existence (i.e. a minimum of 30 years). Since the industry for managing waste OCC is mature, OCC is marketed as a commodity. Official Board Markets (OBM) pricing exists for the Chicago, New York, Buffalo and New England areas and Canadian processors use this pricing as the basis rate for their waste OCC purchases.

There are no mills in Manitoba which recycle OCC, however, there are many mills in BC, Ontario, Quebec and the north central United States that can accept this material. The closest mill is owned by RockTenn and is located in St. Paul, Minnesota. Since the estimated amount of OCC generated on Manitoba farms is equivalent to approximately seven operating days of plant consumption, the mill capacity to process this quantity of materials remains significant.

Based on current market prices and freight rates, the net revenue (i.e. FOB the mill) for OCC would be in the range of $100-$135 CDN per tonne. It must be noted, however, that OCC is currently selling at rates that are higher than historical trends due to diminished residential market supply. These rates will likely see a decrease as the North American economy recovers over time and greater numbers of municipalities renew their diversion programs.

3.5.2. Boxboard

The market for waste boxboard is very similar to that for OCC. The markets for boxboard are quite mature and OBM pricing exists for the same areas that it does for OCC. Although it is considered to be a commodity, the demand for boxboard is lower than for OCC and this is reflected in the market rate.

There are at least three mills located in Ontario, Quebec and Minnesota that could accept boxboard from Manitoba with the closest continuing to be the RockTenn, St. Paul facility.

Based on current market prices and freight rates, the net revenue for boxboard would be in the range of $10-$70 CDN per tonne. Boxboard is also selling at rates that are higher than historical trends due to decreased market supply and these rates could possibly see a decrease in the future as the economy regains lost ground.

3.5.3. Paper Laminates

A paper laminate is, generally speaking, any material with a paper-based substrate with a coating of either plastic and/or metal film.

Mills will not accept waste laminates in bulk quantities because only 50-60% of the substrate paper is recoverable in the re-pulping process. The remaining paper „residue" and the plastic/metal film are typically landfilled and this represents an additional cost to the mill. Some mills will accept laminates blended in with the OCC, but only to a maximum of 1% by weight. Mixed loads of varying quality materials will see a markdown in tonnage rates paid and could possibly risk full load rejection by the processing mills if contamination becomes excessive.

Waste laminates currently have no recyclable value which indicates that the best method for their handling and disposal is likely landfilling.

3.5.4. Agricultural Films (Bale/Silage Wrap and Greenhouse/Mulch Films)

All of these materials are manufactured from blends of low density polyethylene (LDPE), linear low density polyethylene film (LLDPE) and high density polyethylene (HDPE). Bale/silage wrap and mulch film also contain additives to produce a specific desired colour, while greenhouse film

contains other chemical additives which are used for their various light control and heat management qualities.

Until quite recently, recyclers were not interested in these waste materials because either their processes were not equipped to deal with dirt and organic contamination or there were limited end markets for the recycled material. However, current research has indicated that this situation may be rapidly changing. This study has identified at least three companies who are currently recycling these waste films and are actively searching for additional supply.

The first of these companies is Merlin Plastics, a company with recycling facilities in Alberta and British Columbia. Merlin was the company that accepted the grain bags from Saskatchewan"s collection pilot last spring and recycled them through its Alberta facility. They used the knowledge gained from this initial pilot work as a „springboard" for developing both the process to recycle all types of waste agricultural plastics and also the end markets for the processed material. They now have the capacity to manage up to 2,500 tonnes per year of these materials at the plant in Alberta and an additional 5,000 tonnes per year at the plant in Vancouver.

Merlin has recently established a price and material specification for all waste agricultural plastics. They are paying $150 per tonne for material that has dirt and organic contamination not exceeding 5%. Net of freight cost, revenue is expected to be in the range of $80-100 CDN per tonne.

The second company that recycles bale and silage wrap is Poly-America, which is one of the largest North American manufacturers of heavy duty plastic bags and construction film. Their closest facility to Manitoba is located in St. Paul, Minnesota. Since the waste agricultural film can only be used in the production of construction film (due to colour contamination), the demand for it fluctuates in conjunction with the demand for the end product. Poly-America pays approximately $50 per tonne for waste films, so the freight cost to Minnesota would still result in slightly positive net revenue of approximately $10 CDN per tonne. They have not made any contamination specifications available at this time.

The third company that recycles waste bale and silage wrap is called NextLife and their closest plant to Manitoba is located in Frankfort, Kentucky. This company also pays $50 CDN per tonne for waste film which results in a net cost to recycle plastic films material after transportation costs to the Frankfort facility are applied.

3.5.5. Grain Bags

There are two Canadian companies who are now accepting used grain bags to be recycled.

As discussed previously, Merlin Plastics processed the grain bags from the 2010 collection pilot in Saskatchewan and is now able to recycle larger volumes of this material. The price they are paying for waste grain bags is the same as for bale/silage wrap, so the net revenue would be expected to be in the same range of $80-$100 CDN per tonne. Contamination with dirt and organics cannot exceed 5%.

Crown Shred & Recycling is an established processor located in Saskatchewan. They have just started to accept waste grain bags from farmers who are willing to deliver them to its recycling facility in Prince Albert. Crown is not compensating farmers for supplying these bags at this time.

Crown has also recently completed a feasibility study for constructing a new facility for recycling grain bags and, potentially other waste agricultural films. Although it is not a certainty that the company will proceed with construction of this facility, Crown does recognize that waste grain bags are a growing problem in Western Canada and considers this to be a valuable opportunity to be „part of the solution".

3.5.6. Agricultural Twine

Bridon Cordage is a large manufacturer of baling twine and other plastic wrapping products with plants in St. Paul, Minnesota and Saskatoon, Saskatchewan.

Bridon has developed a new process for recycling waste agricultural twine into new twine and in 2007 opened a new facility south of St. Paul, MN dedicated to this process. This plant has a capacity to recycle 2,700 tonnes per year, but is running at only 50-60% of this capacity because of a lack of available material. The plant can process twine with dirt and organics contamination up to 7 or 8%, but this specification is expected to become tighter as more material becomes available in the market. They currently pay $175 CDN per tonne (FOB St. Paul) for truckload quantities of baled twine. Transportation costs are currently estimated at $40 CDN per tonne for approximate net revenues of $135 CDN per tonne.

3.5.7. Net Wrap

This product is normally manufactured from polypropylene fibre and may also contain small quantities of other plastics like nylon. Historically, waste net wrap was not acceptable material for recyclers because it *could* contain plastics other than polypropylene and recyclers" processes could not handle the dirt and organics contamination. However, Merlin Plastics has confirmed that they can process this material if it does not exceed the contamination specification of 5%. Furthermore, Merlin will purchase net wrap for the same price as for agricultural films at $150 CDN per tonne (net of freight cost at approximately $80-$100 CDN per tonne).

3.5.8. Seed Bags (Paper)

It is estimated that 80-90% of the seed sold in paper bags into the Manitoba market is for canola and corn crops. Both of these seeds are typically treated with herbicides and insecticides. Consequently, the empty bags would be considered to be „pesticide contaminated" because of the small amounts of residual pesticide. Since recycling is not an option for pesticide contaminated solids, the appropriate disposal method for this material is likely incineration at the EarthTech Facility in Swan Hills, Alberta. The cost of incineration is approximately two dollars per kilogram inclusive of freight costs.

3.5.9. Feed Bags (Paper)

Depending on the type of feed, these bags can be either unlined or they can have a thin plastic liner. Research methods used were unable to determine an estimate for the percentage of feed bags that fall into these two categories.

Recyclers are not interested in the lined bags because this material is classified the same as the paper laminates. It is possible that the unlined bags can be blended in with the boxboard or even recycled as a separate stream, but this will depend on the extent to which the bags are „contaminated" with residual feed material and also the quality of the boxboard collected.

3.5.10. Plastic Seed and Feed Bags

Merlin Plastics believe that these bags can be recycled using the same process they intend to use for polypropylene wrap. The material will need to meet the contamination specification of less than 5%, as previously discussed, and the pricing will be the same as for film, grain bags and net wrap at approximately $150 CDN per tonne less freight charges of approximately $40 CDN per tonne.

3.5.11. Summary

Table 3 provides a brief summary of findings for the potential recoverable values and costs to recycle the select agricultural material streams. It should be noted that these prices are subject to change based upon a number of factors, but will be primarily tied to the OBM rates(for fibres), crude oil rates (as they relate to plastic production) and fluctuating fuel surcharges (as they relates to the transportation cost component).

Waste Material	Recyclable	Net Revenue (CDN $/tonne)	% Recyclable
Corrugated Cardboard	Yes	$100-$135	91%
Boxboard	Yes	$10-$70	
Paper Laminates	No	$0	
Plastic Films	Yes	$0-$100	100%
Grain Bags	Yes	$80-$100	100%
Net Wrap	Yes	$80-$100	100%
Seed Bags			
- Paper	No (Incineration)	($2000)	0%
- Poly	Yes	$80-$100	100%
Feed Bags			
- Paper	Possibly	Undetermined	Undetermined
- Poly	Yes	$80-$100	100%

Table 5 – Recycled Material Consolidated Net Revenue and Transportation Cost Summary

3.6. Cost/Benefits Model

An effective Stewardship Plan requires a basic cost assessment in order to begin to effectively design and plan for the funding of the infrastructure required to accomplish the program objectives in a sustainable and financially responsible manner. The following financial model provides for an initial estimate of the costs and revenues associated with operating a province wide collection program. This model takes into account Manitoba"s proximity to the Canadian markets in British Columbia, Ontario and Quebec and also the north central Unites States. This model also makes a general set of assumptions of how the waste materials *might* be collected and processed and market in addition to market observations on current, potential values of the different recovered materials,.

It is important to note that the range of net program costs derived from the model is based upon estimated recovered volumes and would fluctuate based upon actual amounts of materials collected, levels of contamination received by the mills, and a number of other variables. The cost assumptions of this model are not intended to be comprehensive, but rather represent the most significant contributors to the system cost structure. Most significantly, material revenues will fluctuate as a result of turbulent economic forces and the capacity of processors to take material as it is generated by the program. It is also difficult to specifically predict how the collection infrastructure will be organized (i.e. type, number and location of sites, financial incentives required). This component of the model will be one of the key factors that determines the ultimate cost of the program.

3.6.1. Geography and Material Volume Assumptions

The municipal sites used by CleanFARMS for its obsolete pesticide container collection programs are distributed across a wide geographic area and are strategically located within the most heavily farmed regions of Manitoba. For the purposes of quantifying the cost of an effective collection program, these locations were considered representative of the dispersion of the farm stakeholders and also for the level of agricultural activity within those areas. Specifically, the proportional volume distributions for the model"s material collection streams were predicted to follow the same historical volume trends as the CleanFARMS pesticide container collection program. For example, if 0.8% of the total pesticide containers collected come from the Alexander, Manitoba site, this same collection percentage was used in the model as its projected share of the other agricultural wastes to be returned and collected at that site. It was also assumed that the returns to all sites would occur uniformly throughout the collection period.

The waste characterization study estimated the quantity of thirteen individual waste materials generated annually in the province. For model purposes, these materials were grouped into several streams by material type and/or processing requirement as this is how they would need to be segregated at the collection sites:

- Stream 1 - Agricultural Films (bale/silage wrap, greenhouse film, mulch film)
- Stream 2 – Plastic twine, net wrap and plastic feed/seed bags
- Stream 3 - Corrugated cardboard (OCC)

- Stream 4 - Boxboard
- Stream 5 - Pesticide contaminated paper seed bags
- Stream 6 - Paper laminates and paper feedbags (with plastic liners)

For the purpose of this analysis, it is assumed that the materials in Stream 6 will be landfilled since recycling markets do not currently exist for them.

Grain bags have been excluded from these material streams under the assumption that these bags are more likely to be collected separately using some type of organized collection blitz. Since there was no definitive reference point for estimating the cost of this type of collection blitz, only the expected revenue from grain bags has been included in the model.

The model assumes a 65% return rate for all materials which is based on CleanFARMS actual long term return rate experience for pesticide containers. This recovery rate was used to estimate the collectable tonnages of each stream (as a percentage of the total available tonnages estimated in the waste characterization study). A figure of approximately 3,336 metric tonnes of recyclables were estimated to be collectible from agricultural sites across Manitoba, (excluding Stream 6).

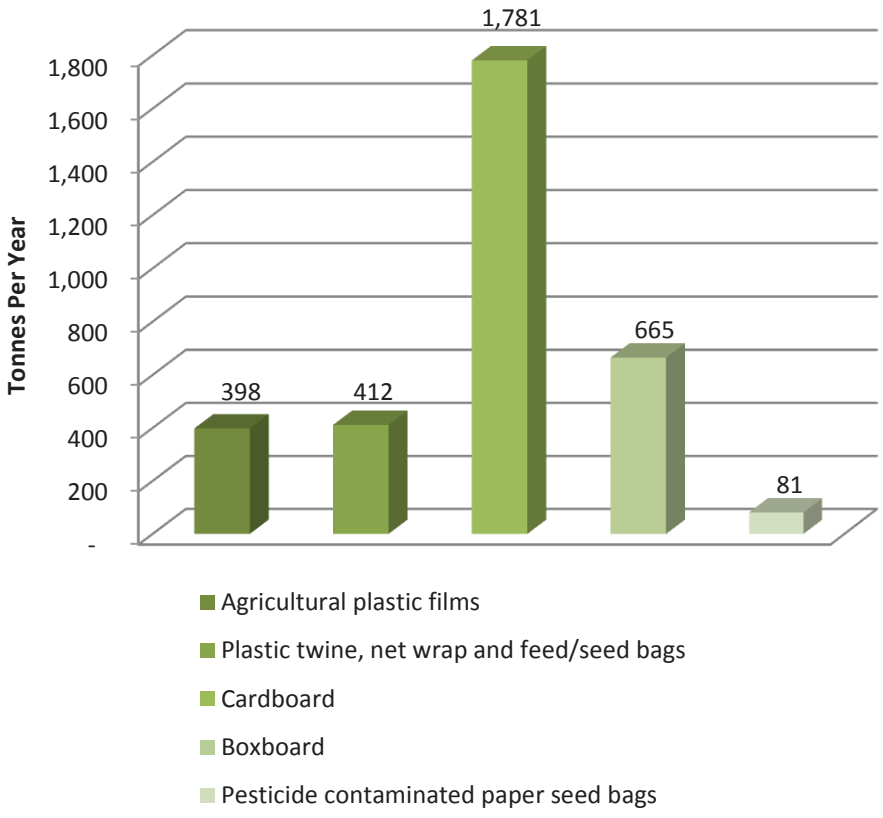

Chart 5 – Recoverable Material Volumes by Stream

Chart 5 provides a weighting of the volumes of different streams of waste materials expected to be collectable in Manitoba.

3.6.2. Collection and Processing Assumptions

Collection containers, commonly referred to as PECCs (Polyethylene Collapsible Containers), holding approximately 1.6 cubic yards of material were considered to be an ideal onsite collection container for this program as they can be stored in a collapsed format and made sturdy for use as needed. As well, this size of PECC maximizes the number of containers that can be loaded into a single trailer for transportation to a central location for baling (48 PECCs on average).

Estimating the weight of PECCs for the individual material streams was critical to the model design as it permitted the estimation of average load weights and the number of loads required annually per site.

In total, it was estimated that approximately 1,200 truckloads per year would be required to service all of the sites across Manitoba. It was also assumed that the materials would be transported to a transfer station in Winnipeg for baling and staging prior to being shipped to either a processing mill or plastics recycler. It is expected that the company picking up the full PECCs would replace these full containers with an equivalent number of collapsed, empty PECCs.

Transportation costs for site servicing were calculated based on an estimate of $1 per kilometre travelled roundtrip (an estimate provided by CleanFARMS" contractor in Manitoba). The model estimates an approximate total of 1,200 round trips per year with an average distance of 430 km per round trip. This formula predicts total program transportation costs for the collection of materials at $516,000, annually.

The baling costs for materials were estimated using a figure of $23 per tonne for OCC or boxboard and $38 per tonne for the waste plastics. These two estimates are consistent with the industry rates currently being charged in Manitoba and result in a total projected baling cost of $152,000 for all of the waste materials combined. An additional assumption was made that the baling facility would incur miscellaneous overhead costs equal to 25% of this total amount.

3.6.3. Collection Cost Estimates

Low cost estimates were calculated based upon the assumption that Stream 2, Stream 5 and Stream 6 materials would be municipally landfilled, specifically because:

- the contamination of paper feed bags was found to be low enough that the material would not require incineration; and
- that all plastic agricultural wastes, other than bale/silage wrap, greenhouse film and mulch film could not be recycled due to processor capacity issues.

High cost estimates assume that the above assumptions do not hold true and that the largest range of materials are recycled and lowest amount are incinerated.

Both estimates *exclude* all of the following costs:

- the collection of grain bags and their transportation to a transfer/processing facility;

- the initial cost of collection containers (PECCs) and their ongoing replacement cost over time; and,
- any general administration costs required to manage the collection and processing of all materials.

Table 4 presents the model"s high and low projections for the transportation and processing costs:

Cost Category	Cost Estimates	
	High	Low
Transportation	$511,000	$452,000
Baling	$152,000	$134,000
Overheads	$38,000	$34,000
TOTAL	$701,000	$620,000

Table 6 – Collection – Transportation and Processing - Cost Projections

3.6.4. Processing Revenue (Cost) Estimates

The revenue estimates are based upon the following considerations which are common to both the high and low revenue models:

- OCC and boxboard are sold based on the current OBM price ranges,
- paper laminates are landfilled at the collection site,
- bale/silage wrap, greenhouse film, mulch film and grain bags are recycled at Merlin plastic"s plant in Alberta (both high and low scenarios),
- twine is recycled at Bridon Cordage"s plant in Minnesota (both high and low scenarios),
- paper feed bags with plastic liners are landfilled at the collection site,
- municipal landfill charges average $10/tonne; and,
- freight costs to all processing plants are based on estimates received from a major transport company based in Winnipeg.

The low revenue model is distinguished by the following conditions:

- the Other Agricultural Plastics would be landfilled when capacity or processing issues prevented them from being recycled, and,
- contaminated seed bags are incinerated if this is the only acceptable disposal method.

The following assumptions were used to create the high revenue model using the best case option for each of the recyclable waste materials:

- the Other Agricultural Plastics would be recycled at Merlin"s plant (high net revenue scenario), and,
- contaminated seed bags are landfilled at the collection point.

The following table summarizes the range of revenues that have been calculated based on these assumptions.

Material Category	Quantity (tonnes collected/year)	Revenue Estimates	
		High	Low
Corrugated Cardboard	1,781	$175,000	$30,000
Boxboard	665	$47,000	$9,000
Paper laminates	234	$(2,000)	$(2,000)
Agricultural Films	273	$30,000	$30,000
Twine	175	$24,000	$24,000
Other Agricultural Plastics	357	$39,000	$(4,000)
Paper Seed Bags	81	$(1000)	$(162,000)
Paper feed bags (with plastic liner)	115	$(1000)	$(1000)
Grain Bags	177	$19,000	$19,000
TOTALS	3,858	$334,000	$112,000

Table 7 – Processing Revenue (Cost) Projections

The above table clearly indicates that recovering a high volume of cardboard (OCC) will be critical to the cost recovery component of the model. OCC has the highest potential recoverable volume and one of the largest post processing margins at approximately $100-$135 CDN per tonne based upon March 2011 OBM rates.

3.6.5. Summary

This analysis indicates that based upon predicted volumes of material streams, the cost estimates for a stewardship program to effectively manage the collection and recycling/disposal of specific agricultural wastes in Manitoba would likely be within the range of $372,000 to $508,000 annually. Since these estimates exclude certain program cost elements and are predicated on a group of assumptions related to the collection infrastructure, real costs will likely correlate with (and possibly exceed) the higher end of the model range.

While the costing model is not intended to be an exact calculation, it is a useful tool for understanding the relationships of cost to volume of materials and as a reference point for future discussions and decisions.

3.7. Stewardship Summary

A typical extended producer responsibility (EPR) stewardship plan usually includes the following key items:

- Clear definition of the stewarded product;
- Targets for collection (accessibility and recovery targets);

- Promotion and education for all stakeholders (stewards and consumers);
- Financing by the stewards;
- Reporting of results.

Addressing the products in this study through EPR stewardship can be accomplished either through voluntary schemes or mandatory schemes. Across Canada and throughout OECD countries, practice has shown that for EPR stewardship schemes to be successful, backstop regulation making the programs mandatory, appear to be the only way to achieve reasonable success. There are, however, some exceptions and the CleanFARMS pesticide container and obsolete pesticide collection program are two.

Exceptions, though, are not easy to find. Given that many of the products identified in this study actually fall under the „mandatory" category, but are still not being managed in an EPR stewardship scheme, it doesn't seem likely that a voluntary program will work for most of the products studied.

Fortunately, this study has shown that there are collection and processing options available for virtually all of the products identified - no technical barrier exists to manage most of these products. The challenge in moving forward with a stewardship model is that new infrastructure and new collection programs will be required.

In the current form, as shown in the farmer survey, many of these products are either burned or buried. In some cases this occurs at the farm level. In other cases it is at the municipal landfill. There is often a charge to dispose of waste products at the municipal level, but often it is free to the farmer, with municipal costs paid for through municipal taxation.

Managing these products through stewardship means that utilizing recycling and safe disposal will add costs to the stewards of the products. These costs will be passed on to the consumers of the product either in added fees at retail or incorporated in the selling price of the product.

While there are benefits to recycling and safe disposal that may far outweigh the added costs of the program, these weren't calculated as part of this study. It should be noted, however, that there is an overwhelming majority of the farmers surveyed in this study that want to manage their wastes in an environmentally responsible manner.

Based on the findings identified above, the following recommendations are made:

4. The stewards that fall under the PPP Regulation should be notified that they are required to address their obligations with respect to that regulation;

5. An interpretation should be made, by regulatory authorities, of the application of the PPP Regulation to twine, bale wrap, grain bags and other like products. If the interpretation is that these products are covered by the regulation, then the stewards should be notified of their obligations with respect to that regulation.

6. Consideration should be given to regulation of products not covered under the PPP Regulation, should it be determined that they require better management through recycling and safe disposal.

Appendix A – Manitoba Agricultural Waste Characterization Study

BlacksheepStrategy

CleanFARMS Inc.
Manitoba Agricultural Waste Characterization Study

02.09.11

Prepared by
Blacksheep Strategy Inc.

Table of Contents

1. Project Overview

CleanFARMS is a non-profit industry stewardship organization committed to environmental responsibility through the proper management and disposal of agricultural waste. They contracted Blacksheep Strategy to conduct a preliminary assessment of the volumes of certain waste products generated in agriculture in the province of Manitoba. The intention is to use this information to assess the feasibility and opportunity for the development of recycling programs for these products.

The primary purpose of this study was to quantify certain types of products used in agriculture in Manitoba. Where the methodology provided the opportunity to do so, a secondary objective was to identify the manufacturers or importers of these products.

- The uses investigated include:
  - Low density polyethylene (LPDE) #4 plastics used in greenhouse film, silage film and grain bags.
  - Twine and mulch film used in commercial horticulture
  - Corrugated cardboard, boxboard, paper laminates
  - Seed bags, feed bags and sandbags

- Information on who is producing or importing these materials was also collected wherever possible.

- The study also looks at whether the existing uses for these products are likely to increase, decrease or stay at existing levels, and whether there are new developments or trends that would impact the use of these products in the future.

During the course of the project, numerous companies and individuals were contacted and asked to supply information or data for use in the research. Each request was preceded by a brief explanation of the project and its purpose. In general, interview subjects were positive about the potential for improved stewardship options for these products. Where questions involved the volume of products produced or sold, interview candidates were assured that their responses would be treated as confidential. As a result, sources may not be disclosed for certain data presented in this report.

2. Methodology

The study used various methods to estimate the quantity of the specified products used in the province of Manitoba.

Literature Review – A review of existing studies with similar objectives but conducted in different geographies provided some metrics which can be applied to this analysis.

Internet Searches – General internet searches provided contact information for domain experts, information on manufacturers and suppliers and some data used to calculate volume estimates.

Domain Expert Contacts – Where possible, we attempted to utilize the expert advice of specialists in the specific application or use of each type of plastic. For example, the Greenhouse Specialist for the province of Manitoba was contacted and asked to estimate the amount of plastic film used for greenhouse covers.

Industry Contacts – Major suppliers and manufacturers were contacted by phone or email to obtain their estimates of market size.

Telephone Survey – For the three paper waste products and sandbags, a quantitative telephone survey of farmers in the province was conducted. Respondents were asked to estimate the volume of corrugated, boxboard and laminates as well as sandbags which were generated on their farm over the course of an average year. The average value per farm was extrapolated based on census population data to arrive at a provincial estimate.

Manufacturers and First Importers - Major suppliers, retailers and manufacturers were contacted by phone or email to obtain their estimates of market size. In some cases, they also provided information on trends and future developments.

Wherever possible, various methods and/or sources were used in an effort to increase the reliability of the estimate. For example, twine is estimated using forage production values as well as livestock numbers and feeding rates. The estimated range of error for most of the products should be in the range of 10% to 20%.

The lists of manufacturers, first importers and retailers included in this report was compiled through internet searches, discussions with those contacted to supply data for this research and from existing documentation.

3. Greenhouse Film

The Provincial Greenhouse Specialist for Manitoba confirmed an estimate of 3.5 million square feet of plastic used to cover greenhouses in the province. When converted to weight using a factor provided by a major manufacturer of greenhouse film, this represents 54.1 tonnes of total use. Unless it is damaged by extraordinarily severe weather, this plastic film is usually replaced every four years. Therefore the maximum total of this type of film plastic available for recycling annually is estimated to be 13.5 tonnes.

While a major manufacturer of this product declined to specify their assessment of the size of Manitoba greenhouse film market, when asked to comment on our estimate, a senior executive with the firm confirmed “that the figure provided is very close.”

It should be noted that this estimate does not include agricultural research greenhouses or those used in the silviculture industry. It is safe to assume that given the value of the contents and the importance of consistent environmental conditions in agricultural research greenhouses, the vast majority would be glass rather than plastic. The use of plastic film for silviculture greenhouses was outside of the scope of this project.

Future developments affecting this product could include the introduction of new technology which displaces or replaces this form of use. The study did not uncover any significant future trends related to use of greenhouse film.

Key volume drivers for this product include total greenhouse production of crops grown under plastic greenhouses and extraordinary weather or other conditions which increase the current rate of replacement.

Suppliers of greenhouse film documented during the research are listed below.

The Professional Gardener Co.
Tom Wright
Beatty, SK
306-752-4150

Westgro Horticultural Supply Inc.
1557 Hastings Cresent S.E.
Calgary, AB T2G 4C8
800-661-2991

HJS Wholesale Ltd.
330 Transport Road
Winnipeg, MB R2C 2Z2
204-668-8360

AT Films Inc.
4605-101 Avenue
Edmonton, AB T6B 3R4
780-450-7760

Northern Greenhouse Sales
Box 1450
Altona, MB R0G 0B0
204-327-5540

Growers Requisites
1915 Setterington Drive
Kingsville, ON
519-326-4466

4. Silage Film and Bale Wrap

An estimated volume of plastic silage film has been calculated based on the total number of cattle in Manitoba. These values were obtained from Statistics Canada. The overall number was broken down into beef and dairy cattle as livestock extension staff estimate about 90 percent of dairy cattle are fed silage and 10 percent of beef cattle are fed silage. The remainder of each segment is fed a ration based on baled forage or straw.

Average feeding rates supplied by the same sources were then applied to the number of cows to arrive at a volume of feed. Two ratios for film use per tonne of silage were obtained from a previous in depth study on silage film use. These ratios were used to calculate a range for the total silage film used in the province. The resulting volumes are 246.3 tonnes and 439.8 tonnes.

These estimates were then reviewed with a major manufacturer of silage film for the Manitoba market. The manufacturer declined to provide a specific estimate of the size of this market, but indicated that his company's estimate of the total silage film use in Manitoba fell very close to the lower of the two estimates calculated. This lower value is the recommended estimate.

To establish a volume for bale wrap we obtained estimates of the percentage of the total forage production that would be baled and wrapped from several sources. These estimates ranged from 20 to 30 percent. The lowest value of 20 percent was used and applied to Statistics Canada's most recent data for provincial forage production resulting in an estimated volume of 160.2 tonnes per year. This estimate was validated by a major manufacturer of these products.

Future developments affecting these products could include any introduction of new technology which displaces or replaces this form of use. No emerging technologies were noted during this research.

Key volume drivers for these products include the number of cattle in the province and the portion of cattle fed silage versus bales.

Several sources we spoke to indicated that there may be a slight decline in the number of dairy cattle being fed silage in the province but added that there was no hard evidence to support this opinion. Our source on the western side of the province indicated that more beef cattle were being fed silage, however he observed that this trend may be a reflection of the wet weather experienced in the past few years and may not indicate a long term change in production practices.

Many sources we spoke to noted an increase in the amount of bales which are being wrapped or placed in plastic tubes over the past two to three years. Once again, the recent wet years may have had a considerable impact on this practice. Wrapping or ensiling bales is one way to preserve and enhance the feed value of baled forages in wet conditions.

Suppliers of silage film documented during the research are listed below.

AT Films Inc.
4605-101 Avenue
Edmonton AB T6B 3R4
780-450-7760

Dubios Agrinovation
478, Notre-Dame,
Saint-Remi PQ J0L 2L0
450-454-3961

Farmer's Sealed Storage
#3, Unit 5 Industrial Park Rd.
South Gower Business Park
Kemptville, ON K0G 1J0
613-258-9818

Up North Plastics
Cottage Grove, Minnesota
651-734-6000

5. Grain Bags

This category is one of the more challenging to estimate. Based on our inquiries, there appears to be no government or other third party data available to augment data obtained directly from the trade, i.e. those who manufacture and retail these products.

A significant number of retailers were interviewed regarding this product. They were geographically dispersed to account for any differences throughout the province. It would appear from our research that there is significant use in western Manitoba but very little use of grain bags in eastern Manitoba.

The estimate of 272.2 tonnes is an average of sales at the retailers interviewed multiplied by an estimate of the total number of retailers in the province. The estimated number of retailers was derived by asking known retailers if they were aware of any other retailers in their market area and compiling a list. Our estimate of the market size was deemed to be reasonable by one of the largest manufacturers of this product. It should be noted from previous research in Saskatchewan that some retailers in Saskatchewan are selling and shipping small quantities of grain bags direct to farmers in Manitoba and this report's estimate will not account for out of province sourcing.

A possible reason for the geographic difference may be the larger average farm size in the western versus the eastern portion of the province. One benefit of storing grain in these bags is reduced trucking costs, i.e. the grain is stored where it was grown until it is marketed versus the incremental cost of trucking and handling associated with hauling it to bin storage at a central location. This benefit is greater when farms are larger and the distances to travel are therefore greater. This reasoning would also seem to explain the higher use rates of this product in Saskatchewan and parts of Alberta where the average farm size is larger and distances to market are greater than for Manitoba.

This use of film plastic in agriculture is the newest or most recent compared to the other products included in this report. Grain bags began to be commonly used for grain storage in the western Canadian market in the last five years. This limited use experience makes it more difficult to determine what the longer term volumes of this product might be. Due to the variable nature of many aspects of production agriculture, all of the limitations to this product may not be known at this time.

Several of the functional limitations of grain bags are being addressed by new technology. For example early users disliked the clumsy nature of unloading the bags when they wanted to remove the grain. Several companies have now introduced grain bag unloaders which solve this logistics problem. This type of innovation suggests that the product is here to stay and the market will likely continue to grow. Over time, more potential drawbacks (vandalism, wildlife damage, grain spoilage over time, etc) to storing grain in bags are being experienced by growers who try them. Like any new product, it will take each farm operation some time and experience to sort through whether this is a good storage option.

While there has been a rapid increase in grain bag use over the past five years, there are few reliable indicators of the extent of future growth. The key volume driver for this product

is increasing crop volumes produced in Manitoba. Larger crops mean farmers do not have enough bin storage and may utilize grain bags as a storage option with a low capital cost for lower value crops such as cereal grains. Retailers confirmed that larger than normal crops increase sales volumes of grain bags.

Suppliers of grain bags documented during the research are listed below.

PowerFill
5015-45 Ave
RR#1, SITE 19, Box 2
Millet, AB T0C 1Z0
780-387-3600

Canadian Hay and Silage Limited
R.R.1, Bowden, AB T0M 0K0
403-224-2072

Grain Bags Canada
Lake Lenore, SK S9K 2J0
306-682-5888

AT Films Inc.
4605-101 Avenue
Edmonton, AB T6B 3R4
780-450-7760

Amity Ag
780-348-5355

Gem Silage Products
403-342-7522

6. Plastic Bale Twine and Net Wrap for Bales

An estimated volume of plastic bale twine and net wrap has been calculated in two ways. The first is based on the total number of cattle in Manitoba based on Statistics Canada data. The overall number was broken down into beef and dairy cattle as provincial livestock specialists estimate about 10 percent of dairy cattle are fed bales and 90 percent of beef cattle are fed bales. The remainder of each segment is fed a ration based on silage.

Average annual feeding rates used in previous similar research were confirmed by a livestock specialist with a background in bovine nutrition. These values were then applied to the number of cows to arrive at a volume of feed. Several ratios for the volume of twine and net wrap used per tonne of forage and straw were then used to calculate a range for the total plastic twine and a value for net wrap used in the province. These values were determined in prior research and result in a range of 268.5 tonnes to 333.4 tonnes of twine and 118.1 tonnes of net wrap. This method does not account for the much smaller livestock sectors such as horses, sheep or bison.

A second method for estimating these products is to apply the average use rates of twine and net wrap to the total forage production value from Statisitcs Canada. This resulted in values close to but slightly higher than the estimates above. These values are shown in Appendix A. Note that this method does not account for forage imports or exports.

Nine twine retailers in various parts of the province were contacted to estimate the percentage of twine use vs. net wrap use. Estimates ranged from a low of 10 percent to a high of 30 percent. A value of 20 percent was used to calculate the estimate.

Because of the slightly higher cost of net wrap vs. twine and the fact that a special attachment for the baler is required, farmers that bale larger volumes and have newer balers are more likely to use net wrap. While a minority of farmers have a net wrap attachment on their baler, those that do have one tend to be larger farmers who account for more of the total tonnes of forage and straw baled in the province.

As with other products included in the research, the development of new or improved technology such as an effective and efficient biodegradable plastic twine would have an impact on this segment.

Introduced to the market approximately 20 years ago with broad adoption beginning 10 years ago, net wrap has gained a significant share of the baling market. Several farmers we spoke with indicate the trend toward net wrap is gaining momentum with more farmers switching each year. The shift from twine to net wrap will increase total volumes of plastic from this source, as net wrap uses more weight per tonne of baled forage or straw.

As cattle numbers are the key driver for the use of this type of plastic, trends in total cattle numbers for the province are an important factor to be considered in all long term planning and projections for sourcing plastic twine and net wrap for recycling purposes.

Suppliers of plastic twine and net wrap documented during the research are listed below.

PowerFill
5015-45 Ave
RR#1, SITE 19, Box 2
Millet, AB T0C 1Z0
780-387-3600

Canadian Hay and Silage Limited
R.R.1, Bowden, AB T0M 0K0
403-224-2072

Donaghy's
Nobleford, AB
403-795-7062

Bridon Cordage Ltd.
Saskatoon, SK
306-652-4133

Amjay Ropes & Twines Ltd.
Newmarket, ON
905-830-6755

Federated Cooperatives
401 22nd St E
Saskatoon SK, S7K 0H2
306-244-3311

Syfilco Ltd.
320 Thames Rd. E.
Exeter, ON N0M 1S3
519-235-1244

Tama Canada Ltd.
50 Dundas Street East-Ste 200,
Dundas, ON L9H 7K6
905-690-4442

7. Mulch Film

The Provincial Specialist, Fruit Crops for Manitoba provided an estimate of for the amount of plastic mulch used on fruit crops in the province. The majority of this product is used on strawberries and saskatoons. These crops are perennial and mulch is only applied in the year of establishment. As a result, annual use rates vary with the number of new acres of each of these crops planted each year. Over the past 5 years on average a maximum of 10 acres of saskatoons is established each year. Use in strawberries is quite low with an estimated annual use of 2 acres per year. Once these acreage values are adjusted for the percentage of the total field area covered by mulch, the average annual use rate for plastic mulch is estimated at 0.4 tonnes.

Current practice in fruit crops is to allow the mulch to degrade over time. It is uncertain whether producers would remove the mulch after the establishment year of the crop if a recycling option was made available to them.

Five of the larger vegetable growers in the province were contacted to determine if plastic mulch is a common production practice in any vegetable crops. All of the growers indicated that there had been some experimental use of plastic mulch in the past. However all had discontinued this practice. When asked if they knew of any commercial vegetable growers using plastic mulch, all responded that they did not.

We also contacted an individual familiar with grower production practices at Peak of The Market, the marketing agency for most Manitoba vegetable production. He confirmed that no large producers are currently using plastic mulch on any vegetable crops.

Several of the sources contacted indicated that plastic mulch may be used on some vine crops and early sweet corn by market gardeners. These operations are typically very small scale and as a result would be unlikely to generate a significant amount of plastic mulch waste.

Future developments impacting the volume of this type of film available for recycling include improvement of biodegradable mulch products available today. The current biodegradable mulch products are reported to decay prematurely. As a result, use is limited. If this problem is solved, it is conceivable that biodegradable mulch could take over the market meaning this source of plastic film is no longer available. A second development might be other improvements to the product which would enhance the agronomic value and therefore increase the use rate.

One trend which was noted for this product during the research project was a growing experimental use on early sweet corn crops. This trend was also noted in the Province of Ontario. With an estimated 6-700 acres of annual sweet corn production in the province, this could become a significant future source of mulch if this production practice becomes common. The key volume driver for this product is the total production of fruit and vegetable crops grown under plastic mulch.

Suppliers of mulch film documented during the research are listed below.

Dubios Agrinovation
478, Notre-Dame,
Saint-Remi PQ J0L 2L0
450-454-3961

Robert Marvel Plastic Mulch
2425 Horseshoe Pike (Rt. 322)
Annville, PA 17003

Westgro Horticultural Supply Inc.
1557 Hastings Cresent S.E.
Calgary, AB T2G 4C8
800-661-2991

The Professional Gardener Co. Ltd.
915-23 Ave S.E.
Calgary, AB T2G 1P1
403-263-4200

Mechanical Transplanter Co.
1150 Central Ave.
Holland, MI 49423
616-396-8738

Plastitech Inc.
478 Notre-Dame, C.P. 750
St-Remi, Quebec J0L 2L0
Toll Free: 800-667-6279

Pliant Corp.
1515 Woodfield Rd. Suite 600
Schaumburg, IL 60173
866-878-6188

Rochelle Plastic Film
P.O. Box 606
Rochelle, IL 61068

Climagro Mulch Film
LECO Industries
3235 Sartelon
St-Laurent, PQ H4R 1E9
800-561-8029

Ken-Bar Inc.
25 Walkers Brook Drive
Reading, MA 01867-0704
781-944-0003

HJS Wholesale
330 Transport
Winnipeg, MB
204-668-8360

Ag Resources Inc.
35268 State Highway 34
Detroit Lakes, MN
218-847-9351

Evenspray
2-851 Lagimodiere Blvd.
Winnipeg, MB R2J 3K4
204-237-9095

Jefferies Nurseries
Portage la Prairie, MB

8. Feed Bags

The first method used to obtain an estimate of the annual volume of feed bags used in the province was to contact suppliers of the bags used by the feed companies. One of the major packaging suppliers was willing to share their estimates of the Manitoba market. They believe that the Manitoba feed market uses in the range of 500,000 to 600,000 paper bags per year. Use rates for poly bags were in the range of 750,000 to 1 million bags per year.

The second approach to estimating the number of feed bags used on an annual basis began with talking to several of feed mills in the province. Mills were asked if they produced bagged feed on a regular basis, what type of bags they used and their opinions on the total number of bags used in the province. Given the competitive nature of the feed business, it was felt that respondents would not divulge actual numbers of bags used as this information would be too sensitive to discuss.

A total of eight companies were called. They represent approximately fifteen mill operations. Of these, six of the mills produced significant volumes of bagged feed on a regular basis. If each of these mills manufactures 30 tonnes of bagged feed per day for 50 weeks of the year, the total bags used would be 1.8 million bags per year. Based on our conversations with mill staff, these volumes seem reasonable.

Some of the individuals we spoke with felt there was a transition from paper to poly bags underway in the industry. One company indicated they were nearing the end of a complete shift from paper and were only using poly bags. Without access to detailed production information from the mills, we relied on the assessment of a representative of the feed packaging industry to estimate the split of poly versus paper bag us in this market.

Some mills interviewed indicated that they used some large 500 kg poly mini bulk bags. The use was not consistent and the volume was not significant relative to the smaller 25 kg bags. As a result, no estimate for the volume of this product is provided.

The Canadian Food Inspection branch for Manitoba was contacted to enquire if they kept records of the volumes of bagged feed produced. While they do conduct regular inspections of the mills and do inspect bagged feed, they do not compile or retain any data which would indicate volume.

Trends noted for feed bags include the shift from paper to ploy as mentioned previously. This shift has been occurring for some time and several sources indicate that one driver is less expensive poly bags available from China. There is also a long term industry trend to less bagged feed and more bulk handling. It should be noted that bagged feed remains the mainstay of smaller less intensive livestock operations. This group is a key target in any future recovery/recycling process.

Suppliers of feed bags documented during the research are listed below.

St Boniface Bag
426 Goulet St,
Winnipeg, MB R2H 0S6
204-237-8510

Continental Industrial Products
173 Woolwich ST, Suite 203
Guelph, ON N1H 3V4
519-837-9720

Provincial Paper & Packaging
6935 Davand Drive,
Mississauga, ON L5T 1L5

Hood Packaging Corporation
5615-44 Street S.E.
Calgary, AB T2C 1V2
403 279 4000

9. Corrugated, Boxboard and Laminates

Some questions were inserted on a quantitative survey of farmers (being conducted for another purpose, but it was possible to insert questions onto the survey), to provide an estimate of corrugated cardboard, boxboard and laminates generated on farms in Manitoba. This methodology was required because these waste products come from a wide variety of sources, which would have been difficult to approach using the industry interview methodology.

The sample size for each product varied slightly: for corrugated cardboard, it is 155; for boxboard it is 159; for paper laminates it is 143. Sample statistics and more detailed survey results for each product are included in Appendix A.

The survey respondents included a random sample of farmers with a representative distribution of farm sizes and locations. The average volume of each material generated was multiplied by census population data to arrive at the following estimates of volume.

- Corrugated cardboard 2739.5 tonnes
- Boxboard 1023.5 tonnes
- Paper laminates 358.0 tonnes per year

Note that a single question was asked for each of the three products, asking farmers to estimate the quantity of each product that they generate in a typical year. They were asked to estimate the height of the pile, if they were to stack each material in a 3 foot by 3 foot square pile (see Appendix B for the wording of the questions). The intent was to obtain a rough estimate of the volume. Note that the survey methodology requires an assumption about the accuracy of respondents' estimates. To a certain extent, there will be a level of error inherent in farmers' estimates and level of knowledge about the amount of waste material that they generate.

Given respondent estimating error and sampling error (i.e., the inherent error in using a sample versus a census), we would estimate the above estimates to be within about 20% of the likely "true" value.

Because we used a primary research methodology (farmer survey) to determine volumes for these products, we did not interview any suppliers of these products as with other items covered in this report. We therefore did not gain any insight into trends for the products or a list of companies generating these waste materials.

One observation is that a high percentage of the corrugated cardboard comes from pesticide packaging. As a result, any changes to packaging practices by this industry could have a large impact on the supply of this product. One example of this would be the shift to more shuttles or totes versus 10 to 23 liter size jugs. This would reduce the number of boxes required to package and ship the smaller container sizes. In fact this trend is likely happening, because other market research that has been conducted for CleanFARMS, in the form of farmer surveys calculated in 2009 and 2010, shows an increase in the portion of Manitoba farms that use the large-sized containers.

10. Seed Bags

The method for estimating the volume of seed bags began by looking at the acres of major crops grown in the province. An average seeding rate was applied to each crop to determine the total amount of seed used by crop. We then used industry values of the rates of certified seed used in each crop to determine a retail volume of seed for each crop. (It is assumed that when growers do not use certified seed the bin run seed is handled in a bulk form.) Seed retailers were then contacted to provide an estimate of the percentage of bulk seed versus bagged seed by crop. They were also asked whether poly or paper bags were commonly used for each seed type.

The above process produced estimates of 124.1 tonnes of paper bags and 46.6 tonnes of poly or plastic bags used by the seed trade in Manitoba on an annual basis. It should be noted that this estimate does not include bags used in the production of seed. Seed growers take very small amounts of breeder seed and over the period of several years, multiply these small amounts of seed into the large volumes of certified seed used by commercial farmers. Because the seed volumes are smaller than on a commercial production farm and because of the need to eliminate contamination, bags are much more prevalent on a seed farm versus a commercial farm. It can be assumed that while this use is intensive, the source would amount to a small percentage of the volume of bags generated by commercial farm operations.

Several trends were noted while investigating seed bags. As with other products, there is a long established trend toward more bulk handling. The key driver of this trend is farm size, as farms become larger there are increased efficiencies in handling seed as a bulk product. This is especially true for bulky crops like cereals and less true for crop types with seed that is denser or seeding rates are that are lower like alfalfa and canola. Some seed companies noted they have begun converting packaging for certain crops to reusable plastic or poly totes. As farms become larger, equipment also becomes larger. Larger seed tanks on seeding equipment make it likely that farmers will increasingly want the efficiency of larger package sizes.

A second trend is the increased planting of canola. Canola seed is almost always sold in a bag as opposed to cereal crops which are mostly bulk. As acres switch from cereals to canola, more bags will be generated. This increase in canola acres is likely long term as several new canola crush plants have recently come on line creating a long term sustainable demand for this crop.

Suppliers of seed bags documented during the research are listed below.

Manyan Inc.
2611 Leger
LaSalle, PQ H8N 2V9
514-364-2420

St Boniface Bag
426 Goulet St,
Winnipeg, MB R2H 0S6
204-237-8510

11. Sandbags

Sandbags were included on the survey of farmers conducted to determine volumes of the three paper based products. Farmers were asked how many sandbags were used on their farm on an average year. There were 175 responses and the average rate was 9.3 per year. When multiplied by the total number of farms in the province and an average weight per bag, the total volume is estimated to be 8.1 tonnes per year.

It should be noted that the farmers selected for the survey were evenly dispersed geographically, resulting in very few survey responses where farmers use sandbags. Given that flooding occurs mostly in certain low-lying areas of the province, we obtained another estimate using different methods to calibrate the accuracy of the survey results. Most sandbags placed on farms are supplied by the local Rural Municipality (RM). We contacted 13 RMs that have a high probability of flooding and asked them to estimate what percentage of the sandbags they used went to farms. We contacted the major long-term supplier of sandbags to the RMs who confirmed that only half the RMs in the province order sandbags on a regular basis and estimated that on average these RMs order 5000 new sandbags per year. The weight using this estimating method was 6.4 tonnes (relatively close to the survey estimate).

Trends were noted that will impact the number of sandbags available for recycling in the future. As a result of recent major flooding, especially in the Red River Valley, many farm sites have been flood proofed or protected in such a way that sandbags are no longer required. A second trend noted in discussions with RMs and provincial EMO staff is that new technology such as large temporary diking systems utilizing materials other than sandbags are being used more frequently.

It should also be noted that the use of sandbags is largely weather dependant. Their use is influenced by weather to a far greater extent than any other product researched. Current predictions are for “flood of the century” type flooding in Manitoba in 2011.

Suppliers of sandbags documented during the research are listed below.

St Boniface Bag
426 Goulet St,
Winnipeg, MB R2H 0S6
204-237-8510

Endurapak
311 Alexander Avenue
Winnipeg, MB R3A 0M9
204-956-3075

11. Volume Summary

Product	Estimated Volume
Greenhouse Film	13.5 tonnes
Mulch Film	0.4 tonnes
Silage Film	246.3 tonnes
Bale Wrap/Bags	160.2 tonnes
Plastic Twine	268.5 to 333.4 tonnes
Net Wrap	118.1 tonnes
Grain Bags	272.2 tonnes
Corrugated	2,739.5 tonnes
Boxboard	1,023.5 tonnes
Laminates	358.0 tonnes
Feed bags (paper)	179.8 tonnes
Feed bags (poly)	383.6 tonnes
Seed bags (paper)	124.1 tonnes
Seed bags (poly)	46.6 tonnes
Sandbags	8.1 tonnes

While the values above are estimates, every reasonable effort has been made to ensure that they are as close to actual use rates as possible. Where assumptions were required, the authors of this study have attempted to err on the side of caution and use the most conservative values available.

The estimated range of error for most of the products should be in the range of 10% to 20%.

Appendix A – Detailed Calculations

Manitoba Agricultural Waste Study			
Greenhouse Film			
Total area of poly covered greenhouse (sq feet)		2,972,300	The most recent Stats Canada data for poly greenhouse area; 2008
Conversion to film area based on 24' average greenhouse width. (sq feet)		3507314	This factor used to convert greenhouse area to area of film used was obtained from two large retailers of greenhouse film.
6 mil, 60% of the market, estimated at 30 lb per 1,000 sq ft (lb)		63132	These market segments were supplied by a major retailer.
8 mil, 40% of the market, estimated at 40 lb per 1,000 sq ft (lb)		56117	These market segments were supplied by a major retailer.
Total lb		119249	This value represents the total film used in the province.
Total Tonnes		54.1	This value represents the total film used in the province.
Annual film replaced and available for recycling		**13.52**	Calls with several of the largest greenhouse operators in MB indicated average replacement is every four years.
Plastic Mulch			
Adjusted area for saskatoons (sq feet)		95832	Ten acres with 4 ft row cover and 14 ft row spacing w/o mulch between rows. Coverage equals 22%.
Area for strawberries (sq feet)		87120	
Total area (sq feet)		182952	Estimates from provincial fruit specialist.
Total annual weight applied lb		966	Density of .00528 lb/sq ft, supplied by a mulch manufacturer.
Total Tonnes		**0.438**	

Silage Film	Total	Value for Calculation	
Number of Beef Cattle; Statistics Canada; July 2010.	774,000	77,400.00	An estimated 10% of beef cattle are fed silage. This estimate from two extension staff.
Number of Dairy Cattle; Statistics Canada; July 2010.	64,000	57,600.00	An estimated 90% of dairy cattle are fed silage. This estimate from two dairy extension staff.
Total number of cattle, adjusted for upright silos.		51,840.00	Silage stored in upright silos does not require cover. 10% of dairy cattle are fed from an upright silo. This estimate from two dairy extension staff.
Using Levitan's 4.2 lb per cow factor		**246.28**	**(tonnes)**
Using Levitan's 7.5 lb per cow factor		439.79	(tonnes)
Bale Wrap			
Forage wrapped (tonnes)		416,250.00	Forage and livestock specialists estimate 20 to 30% of all baled forages are wrapped. 20 % is the value used.
Plastic per tonne (lb)		0.8485	This estimate is calculated from values obtained from a custom bale bagger. 350 lb roll = 412.5 tonne
Volume of plastic wrap (tonne)		**160.21**	

Twine Calculation based on feeding assumptions	Total	Value for Calculation	
Number of Beef Cattle Statistics Canada; January 2010.	774,000	696,600	An estimated 10% of beef cattle are fed silage. This estimate from two extension staff.
Number of Dairy Cattle; Statistics Canada; January 2010.	64,000	6,400	An estimated 10% of dairy cattle are fed bales. This estimate from two dairy extension staff.
Average annual hay and straw volume (tonnes)		3.63	This estimate provided by bovine specialist, U of M. 2.98 tonnes is forage, remainder is straw.
Total hay and straw (tonnes)		2,551,724	
Adjusted for net wrap use		2,041,379	Retailers estimates ranged from 10% to 30% of the market is net wrap. A value of 20% is used.
Twine per tonne of forage and straw (kg) retailer estimate		0.13	This estimate obtained from a large twine retailer during previous research.
Twine per tonne of forage and straw (kg) custom baler estimate		0.16	This estimate obtained from a large custom baler during previous research.
Twine (tonnes) using retailer estimate		**268.54**	
Twine (tonnes) using custom baler estimate		**333.36**	

Twine estimate based on forage production			
Total forage tonnes		3,700,000	2009 is the most recent forage production data available from Stats Can.
Less quantity cut as silage		2,775,000	Twine retailer estimates vary widely from less than 10% to as high as 40% in some areas. An average of 25% was used.
Twine (tonnes) using retailer estimate		**292**	Note that this estimate would not account for hay exports from the province.
Twine (tonnes) using custom baler estimate		**363**	Note that this estimate would not account for hay exports from the province.
Net Wrap based on feeding assumptions			
Volume of forage baled with net wrap. (tonnes)		510,345	Calculated from above.
Net Wrap (tonnes)		**118.07**	Net wrap used at a rate of .51lb per tonne baled. This estimate obtained from a large custom baler during previous research.
Net Wrap estimate based on forage production			
Tonnes baled with net wrap		555,000	20% of forage volume baled with net wrap
Net Wrap (tonnes)		**128.40**	Net wrap used at a rate of .51lb per tonne baled. This estimate obtained from a large custom baler during previous research.

Grain bags		2000	Estimated provincial volume from survey of retailers and confirmed with manufacturer.
Tonnes		**272.17**	Average 300 lb per bag.
Corrugated Cardboard			
Average survey result		91.94	Valid responses = 155
Average survey result (cubic metres)		2.33516	Conversion rate is 0.0254 m/inch
Total Manitoba Farm Operators		21330	Source: 2008 Statistics Canada, Farm Operators by Province
Provincial Total (cubic metres)		49808.99	
Average density (kg/sq metre)		55	Source: Stewardship Ontario
Provincial Total (tonnes)		**2739.49**	
Boxboard			
Average survey result		31.48	Valid responses = 159
Average survey result (cubic metres)		0.79970	Conversion rate is 0.0254 m/inch
Total Manitoba Farm Operators		21330	Source: 2008 Statistics Canada, Farm Operators by Province
Provincial Total (cubic metres)		17057.61	
Average density (kg/sq metre)		60	Source: Stewardship Ontario
Provincial Total (tonnes)		**1023.46**	

Laminates			
Average survey result		18.88	Valid responses = 143
Average survey result (cubic metres)		0.47955	Conversion rate is 0.0254 m/inch
Total Manitoba Farm Operators		21330	Source: 2008 Statistics Canada, Farm Operators by Province
Provincial Total (cubic metres)		10228.84	
Average density (kg/sq metre)		35	Source: Stewardship Ontario
Provincial Total (tonnes)		**358.01**	
Feed Bags (Paper)			
Packaging supplier estimate		500000	One major supplier provided this estimate of the entire market. Several mills thought this estimate was reasonable.
Weight of estimate @ 300 grams per bag (tonnes)		**150**	Bag weight supplied by mill.
Feed Bags (Poly)			
Packaging supplier estimate		1000000	A major supplier estimated the entire market at 500,000 to 1,000,000. A smaller supplier provided an estimate of 300,000.
Weight of estimate @ 320 grams per bag (tonnes)		**320**	Bag weight supplied by mill.
Feed Bags all types calculated		1800000	Assumes six mills bag @ 30 tonne/day each, 250 days/year.
Weight of paper @ 300 grams per bag, 1/3 of volume (tonnes)		**179.82**	Assumes 1/3 of the total calculated market is paper.
Weight of plastic @ 320 grams per bag, 2/3 of volume (tonnes)		**383.62**	Assumes 2/3 of the total calculated market is plastic.

Seed Bags			
Crop	Acres	Bags	Paper or Poly
Wheat	3040000	58462	Poly
Oats	560000	14203	Poly
Barley	480000	7368	Poly
Rye	45000	570	Poly
Flax	175000	5250	Poly
Canola	3370000	288164	Paper
Corn	240000	108597	Paper
Peas	80000	9697	Poly
Soybeans	520000	Returnable	Poly
Dry Beans	135000	Returnable	Poly
Sunflower	135000	16875	Paper
Forages are perennial, estimate based on trade information.		50000	Poly
	Bags	Tonnes	
Total paper seed bags @ 300 grams per bag	**413636**	**124.09**	
Total plastic seed bags @ 320 grams per bag	**145550**	**46.58**	

Sandbags			
Average survey result		9.3	Valid responses = 175
Total Manitoba Farm Operators		21330	Source: 2008 Statistics Canada, Farm Operators by Province
Provincial Total (bags)		198369	
Average weight (kg)		0.04082558	90lb/1000 bags; supplied by a major supplier for Manitoba.
Provincial Total (tonnes)		**8.10**	
Use rate		3.45%	This portion of our survey sample reported using sandbags on their farm during an average year.

Appendix B – Farmer Survey Questions

We're trying to estimate the volume of certain types of packaging material generated on farms in order to assess various recycling options for each product. We'd like your estimate for the volume of each of three packaging products on your farm, for farm purposes, as opposed to household based.

Corrugated cardboard is defined as cardboard with ribbed or wavy layers in it. If you took all of the corrugated cardboard that comes onto your farm in a year, flattened it, and then stacked it in a pile that's 3 feet by 3 feet square, how high would the stack be? (clarify if needed – how high would the stack be in feet or inches?)

Boxboard is defined as the thin cardboard like the material used to make cereal boxes. If you took all of the boxboard and other paper packaging that comes onto your farm in a year, flattened it, and then stacked it in a pile that's 3 feet by 3 feet square, how high would the stack be? (clarify if needed – how high would the stack be in feet or inches?)

Paper laminates are defined as combinations of paper coated with plastic or aluminum or other materials. An example is a tetra or juice box, however we are still referring to this type of material used in packaging of farm products. If you took all of the paper laminate packaging of agricultural products that come onto your farm in a year, flattened it and then stacked it in a pile that's 3 feet by 3 feet square, how high would the stack be? (clarify if needed – how high would the stack be in feet or inches?)

Thinking about the past ten years, on average, how many sandbags do you use each year on your farm?

Appendix B – Manitoba Agricultural Waste Producer Survey

BlacksheepStrategy

CleanFARMS
Manitoba Farmer Survey

Final Report
January 26, 2011

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Executive Summary

This document presents the results of a survey of Manitoba farmers, conducted in November 2010. The overall purpose of the research was to gain insight into farmers' behaviours and attitudes related to agricultural waste and recycling, in order to build a base of knowledge to help meet CleanFARMS' objectives.

A quantitative telephone survey was undertaken, targeting 300 farmers in Manitoba. The survey was conducted in November 2010. A sample of this size provides a margin of error of +/- 5.6% at the 95% confidence level. This means that for a given result, we can be 95% confident that the survey result is within 5.6% of the "true" result if we had done a census of the entire population. The margin of error is at its widest for a result of 50%, and is narrower for percentages above or below 50%.

The sample included about 49% of growers with primarily crop operations, 39% with mixed crops and livestock, and 12% with primarily livestock. Average acreage within the sample was 1,420.

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Waste generation

The most common types of waste materials generated on farm include:

- Waste oil and filters (95% of respondents generate in a typical year or have on farm)
- Plastic oil or antifreeze containers (89%)
- Unwanted tires (83%)
- 10L size-range (under 23L) pesticide containers (77%)
- Empty seed bags (71%)
- Cardboard packaging from pesticides (69%)
- Just over 60% of farmers also generate or have plastic or cardboard packaging from agricultural products.

The least common waste materials include: used grain bags (11%), used plastic bale or silage wrap (16%), and empty containers from livestock cleaning products (19%)

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There are some differences in the portion of farmers who have each type of waste material, primarily based on acreage, with farmers with 5000 or more acres more likely to have waste oil and filters and unwanted tires, and those with 2500 or more acres more likely to have 10 L pesticide containers and their cardboard packaging, empty feedbags, unwanted pesticides and large containers (totes, drums).

Respondents were asked how they dispose of each of the waste materials they have on their farm. Following are the ways that the most predominant materials are disposed of:

- Waste oil and filters - Collection site (33%), town recycling (12%), private waste removal (12%), town landfill (9%), burn (8%)
- Plastic oil or antifreeze containers - Town landfill (24%), collection site (23%), burn (17%), town recycling (15%)
- Unwanted tires - Town landfill (25%), collection site (24%), town recycling (15%), store to deal with later (15%)
- 10 L size-range containers - Return to a collection site (89%)

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A high portion of farmers are burning seed bags, plastic wrap, cardboard packaging, twine or net wrap, feed bags, plastic silage and bale wrap, Styrofoam packaging.

A high portion of farmers are storing the following on their farm: sharps and needles, antifreeze, pesticides, paints and solvents, unwanted tires.

A portion of farmers are putting the following in municipal landfill: plastic oil or antifreeze containers, tires, plastic wrap and packaging, paints and solvents, sharps or needles, Styrofoam packaging, animal health products, livestock disinfectant containers.

There are some interesting regional differences in how farmers are disposing of their waste, with those in the Winnipeg North / Interlake region being less likely to burn, and more likely to use recycling or collection sites.

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Attitudes towards waste disposal

Farmers consider responsible disposal of waste to be a highly important issue, with 98% agreeing that responsible disposal of agricultural waste is very important (79% strongly agreeing).

While a high portion generally agree that the agricultural industry is doing enough to ensure that there are responsible ways to dispose of their products, agreement is “moderate” with 42% strongly agreeing and 42% somewhat agreeing. Further, 15% disagree (5% strongly and 10% somewhat) that the industry is doing enough.

One in five farmers have waste materials on their farm of which they are unsure of how to safely dispose.

About six in ten farmers say they are not comfortable burning or putting certain wastes in the landfill, but don’t see an alternative. This seems to indicate a significant level of engagement and concern about this issue.

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Container recycling – awareness of collection program and disposal methods

Among those farmers who generate 10L size-range containers, 94% are aware that there is a collection and recycling program for these containers.

Concerning how they dispose of their empty 10L containers, 92% take at least some of their containers to a collection site.

About two in ten (17%) reuse some of their containers. Another 13% burn some of their containers (although a very small portion say this is the primary way they dispose of their containers).

Over two-thirds (67%) percent of Manitoba farmers return 100% of their jugs. However, one-third return less than 100%. Only 7% don't return any, and this number may be even lower, based on some of these farmers indicate that they do take their jugs to their retailer (apparently not considering this to be "recycling."

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Including all farmers who generate these jugs and considering those who don't return any as well as those who return some or all, survey results indicate that on average, 89% of jugs are returned.

Those whose operations are "primarily livestock" but who do generate 10L containers on their operation, are less likely to return empty containers. We would expect, however that these type of operations might typically produce fewer containers.

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Container recycling – what motivates farmers to return their containers?

Just over a third of farmers who return their containers are primarily motivated by a desire to be environmentally responsible – they feel that returning containers is just "the right thing to do." Another 8% cite a related reason of liking the idea of recycling and making something new out of the used materials.

Just over a quarter return their containers because it is simple for them to do so. Basically, it is more convenient to return the containers than to do anything else with them.

About one in five return their containers because it cleans up the farm and frees up space. Further, a very high portion agree that the greatest benefit of recycling is a clean yard and farm.

About one in ten want the containers off their farm due to safety concerns.

There is a group who say they return their containers because they don't like the alternative of burning (10%) or putting them in the landfill (4%). Only a small portion of farmers are motivated to return their containers out of a feeling of compulsion or fear of breaking the law (3%).

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Those who do not return 100% of their containers were asked why. Many of these indicate that they reuse some of their containers. Many of these are reusing some containers for holding oil, fuel or water, or storing other materials. Another smaller segment said they didn't return some containers because it is easier to burn them, or there are too many containers to return them all, or they couldn't get them clean.

Only 7% of farmers who generate 10 litre containers do not return any containers. Of this small number, the largest portion say that it is not convenient for them to return containers or that their collection site is too far away. Some of these actually do return their containers to a retailer (although they said they don't return containers to a recycling or safe disposal location). Therefore, it is possible that the 7% figure is overstated and there are very few that don't return any of their containers.

When asked what would encourage them to return more containers, the largest portion of respondents mentioned having closer or more convenient sites.

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Analysis shows a strong correlation between distance to site and portion of containers returned: the closer the site, the higher the portion returned. Among those whose site is 10 km away or closer (and who know where the site is), 93% of containers are returned.

A number of agree-disagree statements were read to respondents to measure attitudes related to container recycling. The statements with the highest level of agreement included:

- The greatest benefit of returning containers is a clean yard and a clean farm
- Returning and recycling containers demonstrates that you have good stewardship practices
- I have a pretty good system for collecting up my containers and returning them

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Unwanted or obsolete pesticides

About 31% of respondents generate unwanted pesticides in a typical year or have unwanted pesticides on their operation. About half of farmers with unwanted pesticides say these pesticides are 3 years old or less.

The vast majority of farmers who have unwanted pesticides are aware of the pesticide collection program. Only 6% of all respondents have unwanted pesticides but are not aware of the program.

When asked how often they would accumulate enough unwanted pesticides that they would want to dispose of them, about one-third indicated that they would want to dispose of unwanted pesticides every 2 to 3 years, while another third said every 4 to 5 years, and only 9% said every year.

We estimate Manitoba farmers have approximately 277,000 litres plus 900 kg of unwanted pesticide on farm. This is a midpoint of a range, and when we apply the margin of error to these numbers, we obtain a range of between 194,000 and 360,000 litres and 100 and 1,700 kg.

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Communications

When asked where they are most likely to find out about recycling or safe disposal programs, the most common responses were: farm newspapers, radio, and brochures / flyers.

When asked to rate the usefulness of a list of information sources, farm newspapers and magazines were most highly rated, followed by crop input retailers. Other farmers are also seen to be a useful source of information.

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Discussion and Implications

Which waste materials are best candidates for increased disposal alternatives?

This survey did not address volume, so there may be some materials that are a problem, even though a comparatively low portion of farmers have them. The survey did not take into account the toxicity or harmfulness of particular materials ending up in landfill or being burned, so again, even if there is a low portion of farmers with certain materials, there may be other reasons to consider a particular material a priority.

Based on the more prevalent waste materials, combined with looking at how these items are disposed of, it appears that a disposal program is more urgently needed for:

- Plastic oil and antifreeze containers - a high portion has them, and over 40% get burned or put in landfill
- Empty seed bags - a high portion has, and a high portion gets burned or put in landfill
- Plastic wrap or packaging - a high portion has, and most gets put in landfill or burned

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Discussion and Implications

- Cardboard packaging from pesticides and other products - a high portion has, and a high portion gets burned
- Twine or net wrap - a high portion gets burned or put in landfill
- Sharps or needles – a lower portion has, but a high portion gets put in the landfill
- Styrofoam packaging – over three-quarters ends up in landfill or being burned
- Empty feedbags – a lower portion has, but a high portion gets burned or put in the landfill
- Plastic wrap from hay or silage bags – a lower portion has, but two-thirds of farmers burn it
- Empty plastic livestock disinfectant containers and unwanted animal pharmaceuticals – over 40% is burned or put in landfill

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Discussion and Implications

Farmers specifically mention being concerned about disposing of plastic wraps and twine, two of the materials identified above. Canola seed, treated seed, and fertilizer were also mentioned by a small portion as materials they are unsure how to safely dispose of.

Those with livestock operations have specialized needs, including the need to responsibly dispose of plastic bale and silage wrap, plastic disinfectant and cleaning containers, sharps and needles and pharmaceuticals. They are also more likely to have pesticide containers stored on their operation (i.e., they are less likely to return all their pesticide containers. Therefore this might be a particular segment that could be targeted through specific communications or programs.

Farmers have a high level of concern for responsible disposal of waste agricultural products, and it appears they would be open to disposal programs that are convenient and accessible.

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Discussion and Implications

Container recycling

The survey results suggest that 89% of jugs are returned. For those farmers who return some but not all containers, it appears that many are using the empty containers for other purposes. To get these last few jugs returned, communications around the theme of “every last bit is important” may be effective.

For farmers who don’t return jugs, distance from collection point appears to be the main issue. It is significant that the closer the collection point, the higher the portion of jugs returned, so in areas where distance is an issue, consideration should be given to setting up alternative collection points. Possibly, a periodic mobile collection option could also be considered.

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Discussion and Implications

There are some strong intangible motivators for returning containers – including the motivation to "do the right thing" and take care of the environment. Combined with this is the preference for making something new out of waste items, not wanting to burn or increase the landfill, and safety concerns. As far as rational motivators, the practical aspect of cleaning up the farm and getting the containers out of the way is the third most commonly mentioned reason for recycling, so is a relatively important tangible driver.

Awareness of the container recycling program does not appear to be an issue, as the vast majority are aware of the program and of the location of collection sites near them.

Aside from ensuring that there is a convenient collection point close to all farmers, there were only a few other suggestions as to how to increase participation – including allowing farmers to return containers "as is" or having some kind of deposit or incentive. A very low portion suggested these ideas.

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Discussion and Implications

For a few, there is an issue of not being able to get the container clean, with some saying that they would be more likely to return containers if CleanFARMS would take the containers as is. Perhaps there really are certain pesticides that are extremely difficult to rinse completely out of containers – perhaps the program could be modified to accept the containers in some cases.

It appears that there is sufficient communication about the container recycling program, and this was not cited as a reason for not returning containers.

As the issue of stewardship comes more and more into the public eye, with attention to EPA, it is likely that farmers will feel greater responsibility to recycle as many jugs as possible.

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Discussion and Implications

Pesticide Collection

About 31% currently have unwanted pesticides on their farm, and about half of of these are under three years old, while half are older. This may warrant another collection program within the next year or two. Most farmers thought a program should be held every 2 – 3 years or every 4 – 5 years.

The results show that most growers who generate unwanted pesticides know about the pesticide collection program. It appears that most are willing to use the program, and the primary reason that they don't return the pesticides is that they think they might eventually use the pesticides.

CleanFARMS could also develop an ongoing process to track need – perhaps a "registry" where farmers could go to indicate that they have unwanted pesticide (perhaps this is already done). Farmers could update their entries from year to year, if they end up using the pesticide. In this way, CleanFARMS would have an ongoing "inventory" of unwanted pesticide and a way of gauging when it is time to run the program again.

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Discussion and Implications

Communications

For future communications about recycling and safe disposal programs, farm publications would be most effective. Ensuring that retailers know all the disposal options is also key, as they are considered to be among the most useful sources.

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CleanFARMS
Manitoba Farmer
Survey

Introduction

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Introduction and Objectives

This document presents the results of a survey of Manitoba farmers, conducted in November 2010. The overall purpose of the research was to gain insight into farmers' behaviours and attitudes related to agricultural waste and recycling, in order to build a base of knowledge to help meet CleanFARMS' objectives. More specifically, this research set out to:

- Understand what agricultural wastes need to be managed, and how farmers currently dispose of / recycle specific waste products
- Determine farmer's awareness and attitudes towards pesticide container recycling program, to provide input into what action is required to achieve 80 per cent container return rate
- Examine the need for another wave of the obsolete collection program
- Explore information sources and preferences

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Introduction and Objectives

To address these research objectives, a quantitative telephone survey was undertaken, targeting 300 farmers in Manitoba. The survey was conducted in November 2010.

The survey targeted a representative distribution of farmers from all growing areas in Manitoba. We weighted the final data to ensure that the results are truly representative based on 2006 Census data. Following are both the weighted and un-weighted distribution by census agricultural region.

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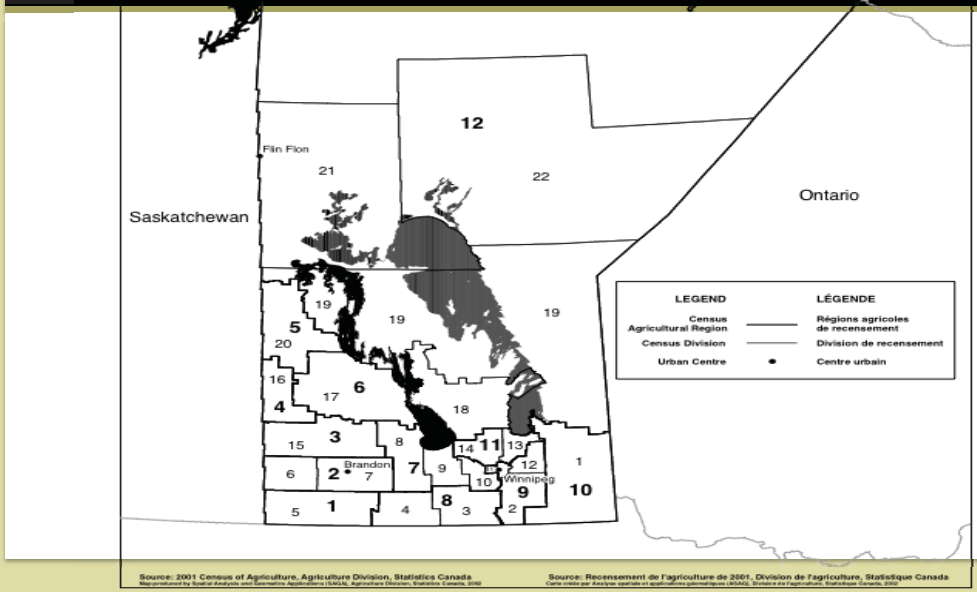
Regional distribution

N=300	Weighted	Un-weighted
Southwest (CAR 1, 2)*	17%	22%
Northwest (CAR 3 – 6)	26%	32%
South Central (CAR 7, 8)	26%	25%
Southeast (CAR 9, 10)	16%	11%
Winnipeg north and Interlake (CAR 11, 12)	16%	10%

* See Census Ag Region reference map on the following slide



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Accuracy of this research

A total sample of 300 out of a population of 15,628 Manitoba farms (2006 Census) provides an overall level of accuracy of +/- 5.6% at the 95% confidence level. This means that for a given result, we can be 95% confident that the survey result is within 5.6% of the "true" result if we had done a census of the entire population. The margin of error is at its widest for a result of 50%, and is narrower for percentages above or below 50%.

On a regional level and based on farm type, the accuracy ranges from +/- 9% to +/- 12% at the 95% level. Differences between regions, farm type and farm size were analyzed, and where these differences are statistically significant and notable, they are described in this report.

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Comparisons to previous research

Some of the survey results are compared to a similar survey that was conducted in the spring of 2009. This was a survey of prairie farmers, with a relatively small sample in Manitoba. Where appropriate, we draw some comparisons between the two measures. For the most part, the 2009 and 2010 measures were very similar.

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Respondent Profile

As seen on the following slide, about half of respondents had crop only operations, while 40% had mixed operations, and just over 10% had primarily livestock operations.

Acreage ranges from 15 to 10,000, with average acreage being 1,420.

Just over half had livestock. Among those with livestock:

- 83% have cow/calf (average 160 head)
- 5% have dairy (average 161 head)
- 7% have hogs (average 980)
- 5% have poultry (average 11,600)

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Respondent Profile

Farm type	
Crops only	49%
Mixed crops and livestock	39%
Primarily livestock	12%
Farm size	
<1000 acres	51%
1000 – 2499	34%
2500 – 4999	12%
5000+	3%

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CleanFARMS Manitoba Farmer Survey

Agricultural Waste

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Types of agricultural waste on farms

A list of various types of agricultural waste was read to respondents, and they were asked whether they typically generate each type of waste in an average year, and / or currently have that type of waste on their farm.

Respondents were asked to consider only agricultural waste, as opposed to household waste.

The following slides show the portion of farmers who generate or have each type of waste. We see that waste oil and filters, and plastic oil or antifreeze containers are the most common types of waste generated, followed by unwanted tires, 10L size-range (under 23L) pesticide containers, and empty seed bags.

The 2009 study addressed the extent to which farmers use large drums and totes. In that study, 21% of Manitoba farms used these large containers. In 2010, the current study found that 28% use drums and totes.

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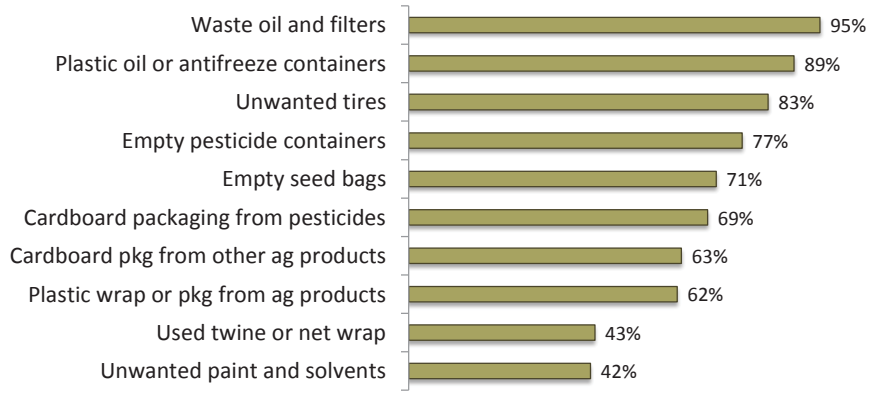
Types of farm waste generated



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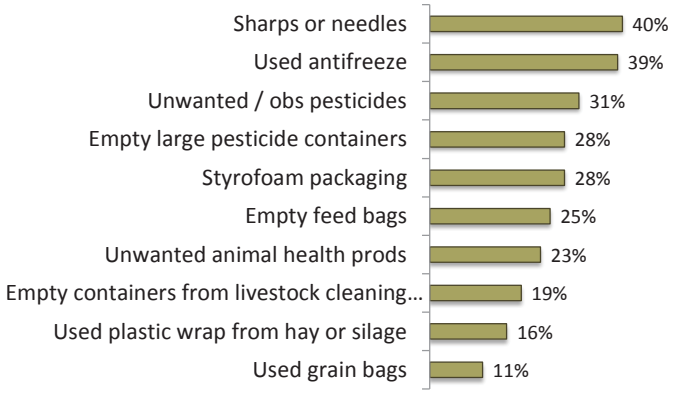
Types of farm waste generated (cont.)



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Types of agricultural waste on farms – segment differences

As seen on the following slides, there are some differences in the portion of farmers who have each type of waste material. The most notable differences are based on acreage, with farmers with 5000 or more acres more likely to have waste oil and filters and unwanted tires, and those with 2500 or more acres more likely to have 10 L pesticide containers and their cardboard packaging, empty feedbags, unwanted pesticides and large containers (totes, drums).

This information would be important in determining where certain types of waste material are more prevalent and in which sectors, to aid in setting priorities and developing processes for waste collection.

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Segments more and less likely to generate each type of waste

N=300	Percent who have	Who is more likely to generate or have on farm?	Who is least likely to generate or have on farm?
Waste oil and filters	95%	5000+ acres	No significant differences
Plastic oil or antifreeze containers	89%	No significant differences	No significant differences
Unwanted tires	83%	5000+ acres	No significant differences
10 litre size range containers	77%	1000+ acres and especially those with 2500+ acres	Livestock only
Empty seed bags	71%	2500+ acres	Livestock only
Cardboard packaging from pesticides	69%	South-Central MB, 2500+ acres, primarily crops	WPG North and Interlake, livestock only

Continued…

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Segments more and less likely to generate each type of waste

N=300	Percent who have	Who is more likely to generate or have on farm?	Who is least likely to generate or have on farm?
Cardboard packaging from other ag products	63%	No significant differences	No significant differences
Plastic wrap or packaging from ag products	62%	Mixed crops and livestock	Livestock
Used twine or net wrap	43%	SW MB	SE MB
Paint and solvents	42%	No significant differences	No significant differences
Sharps or needles	40%	No significant differences	No significant differences
Used antifreeze	39%	No significant differences	No significant differences
Unwanted pesticides	31%	2500+ acres	Livestock only

Continued…

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Segments more and less likely to generate each type of waste

N=300	Percent who have	Who is more likely to generate or have on farm?	Who is least likely to generate or have on farm?
Drums, totes, shuttles	28%	2500+ acres,	< 1000 acres, livestock
Styrofoam	28%	No significant differences	No significant differences
Empty feed bags	25%	No significant differences	No significant differences
Animal health products	23%	No significant differences	No significant differences
Empty containers from livestock cleaning products	19%	No significant differences	No significant differences
Used plastic wrap from silage or hay bales	16%	SW MB	SE MB
Used grain bags	11%	No significant differences	No significant differences

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How do farmers dispose of their agricultural waste?

The following series of slides show how farmers dispose of their agricultural waste, through a pie chart showing the portion who dispose of their waste in each way.

The pie slices are colour-coded, so that the same colour always shows the same method of disposal, for easier comparison between types of waste.

Farmers were asked how they dispose of each type of agricultural waste that they have on their farm and were also read a list of possible ways they might dispose of the waste. The order of the options was randomized for each respondent. The question was as follows:

I would like to ask you what you do with each of these waste materials that you have on your farm. For example, this could include (read and randomize): Return to a collection site for recycling or safe disposal, Return to the retailer or supplier, Take to the municipal or town landfill, Bury on farm, Burn on farm, Store or save to deal with later, Wait to take to a safe disposal site when one comes into your region, Re-use, Put into municipal or town recycling, or other.

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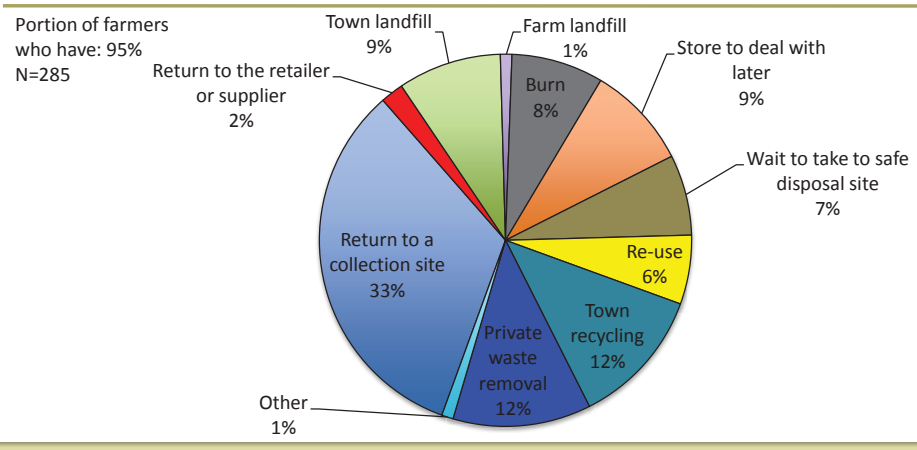
What is done with waste oil and filters?



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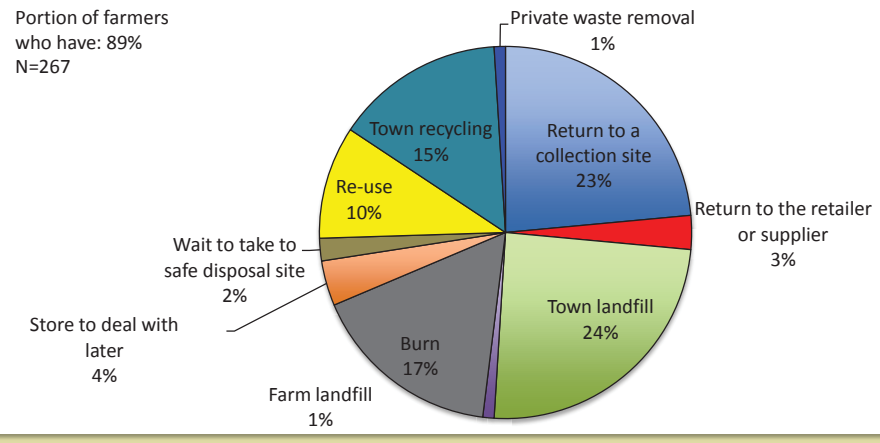
What is done with plastic oil or antifreeze containers?



44

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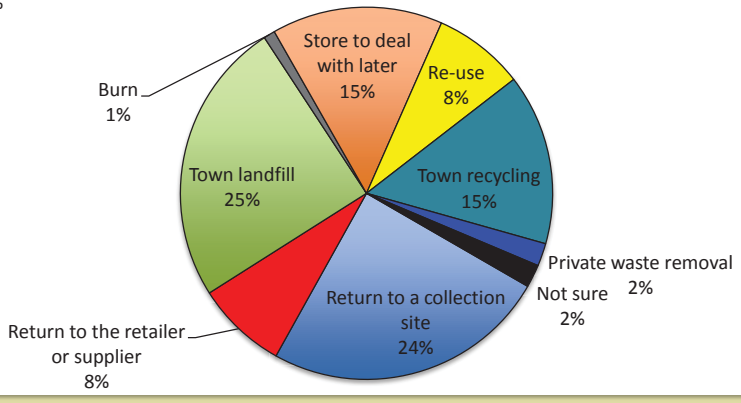
What is done with unwanted tires?

Portion of farmers who have: 83%
N=249



45

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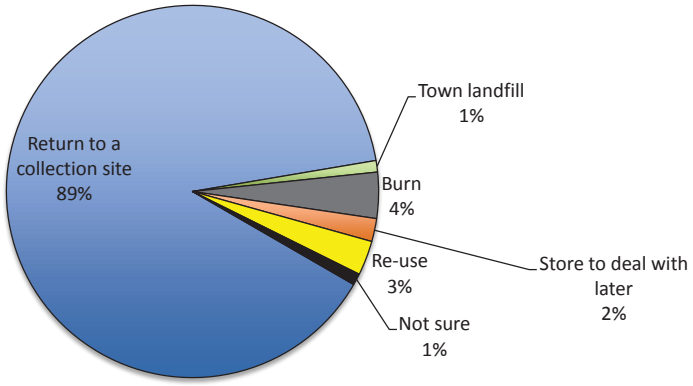
What is done with empty 10L size-range containers?

Portion of farmers who have: 77%
N=231



46

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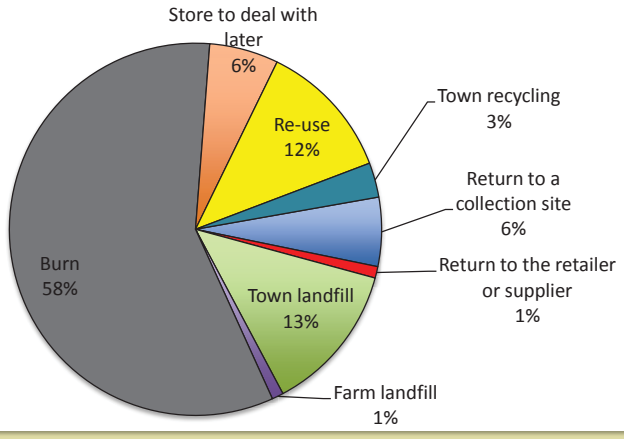
What is done with empty seed bags?

Portion of farmers who have: 71%
N=213



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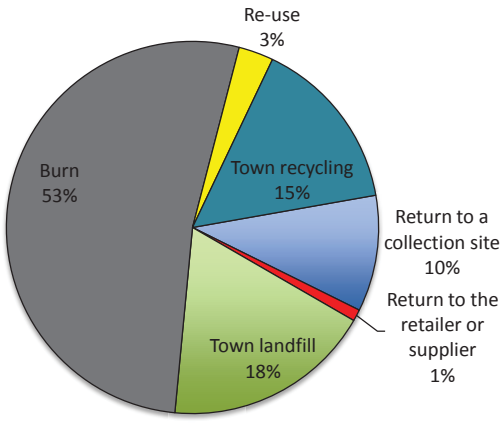
What is done with cardboard packaging from pesticides?

Portion of farmers who have: 69%
N=207



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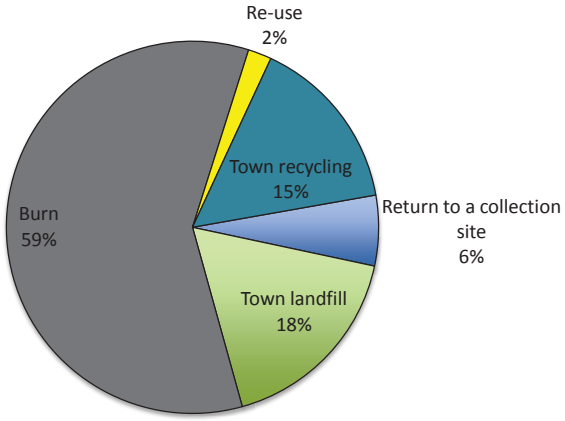
What is done with cardboard packaging from other ag products (not pesticides)?

Portion of farmers who have: 63%
N=189



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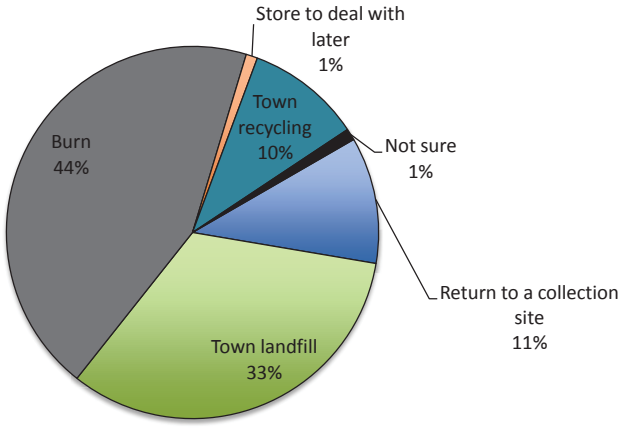
What is done with plastic wrap or packaging from ag products?

Portion of farmers who have: 62%
N=186



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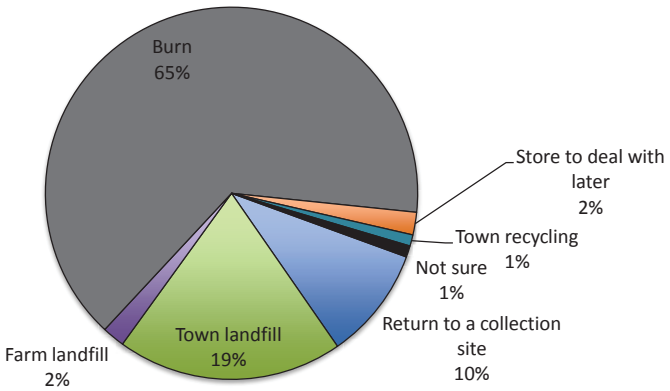
What is done with used twine or net wrap?

Portion of farmers who have: 43%
N=129



51

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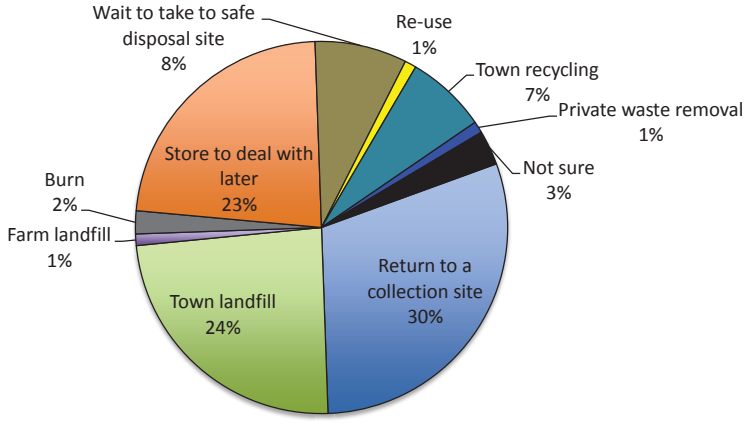
What is done with unwanted paint and solvents?

Portion of farmers who have: 42%
N=126



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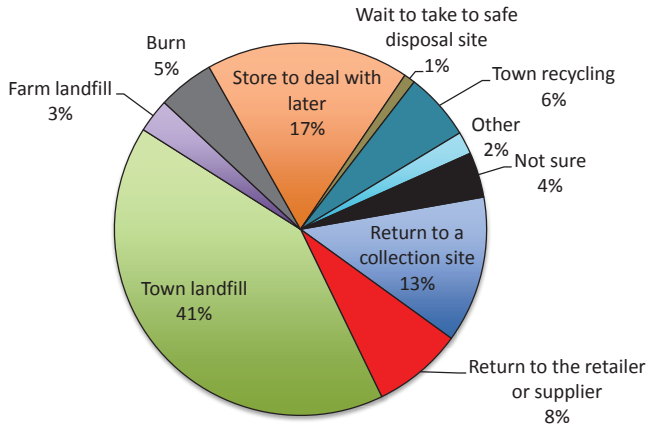
What is done with sharps or needles from livestock?

Portion of farmers who have: 40%
N=120



53

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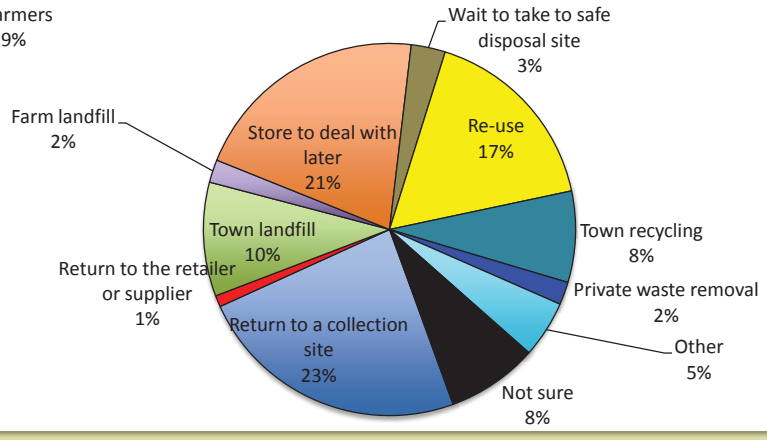
What is done with used antifreeze?

Portion of farmers who have: 39%
N=117



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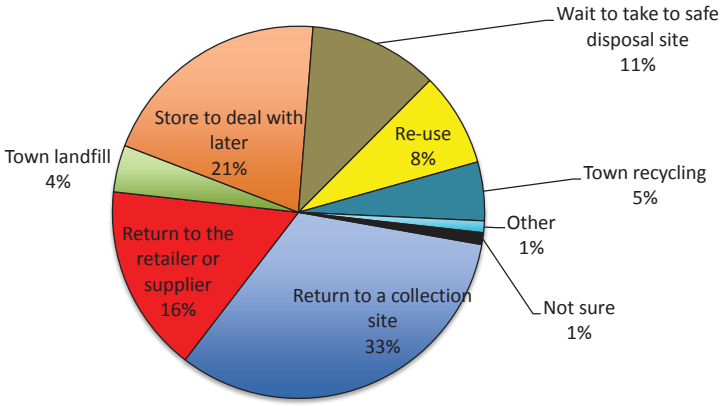
What is done with unwanted, old or obsolete pesticides?

Portion of farmers who have: 31%
N=93



55

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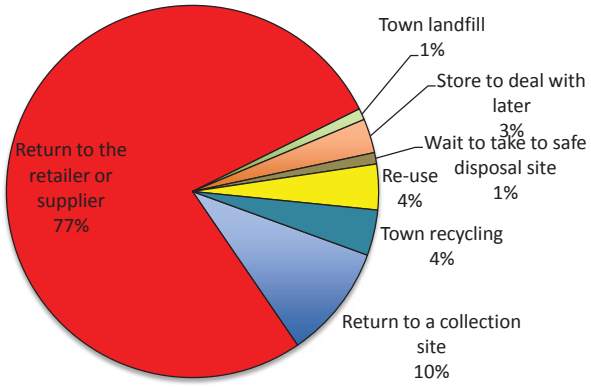
What is done with empty large containers (totes, drums)?

Portion of farmers who have: 28%
N=84



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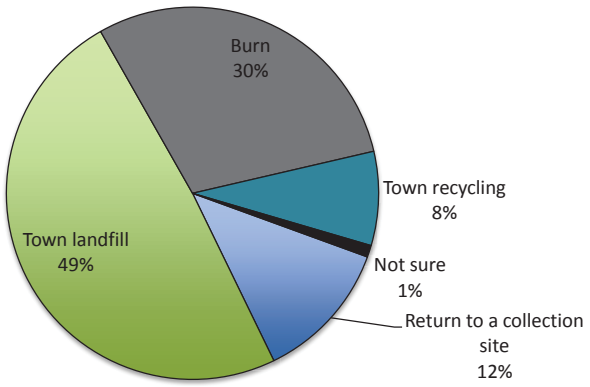
What is done with Styrofoam packaging from ag products?

Portion of farmers who have: 28%
N=84



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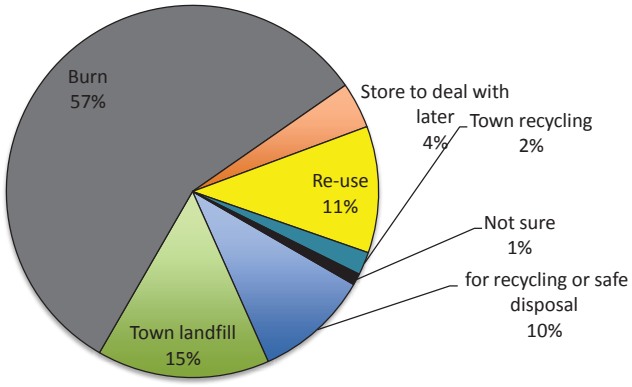
What is done with empty feed bags?

Portion of farmers who have: 25%
N=75



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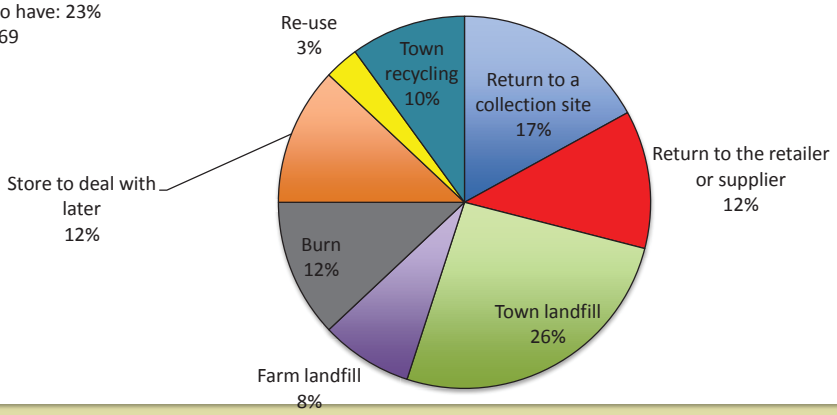
What is done with unwanted animal health products or pharmaceuticals?

Portion of farmers who have: 23%
N=69



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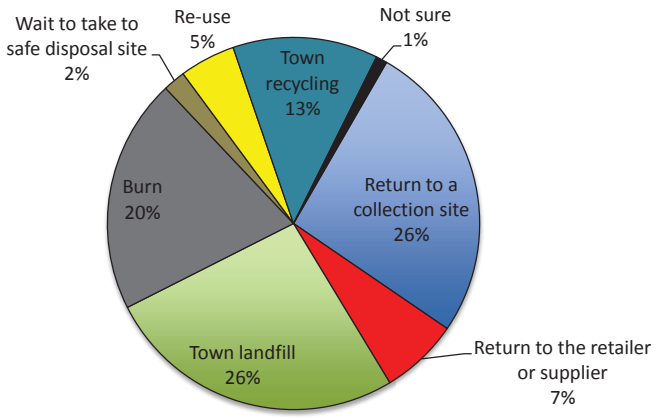
What is done with empty plastic livestock disinfectant product containers?

Portion of farmers who have: 19%
N=57



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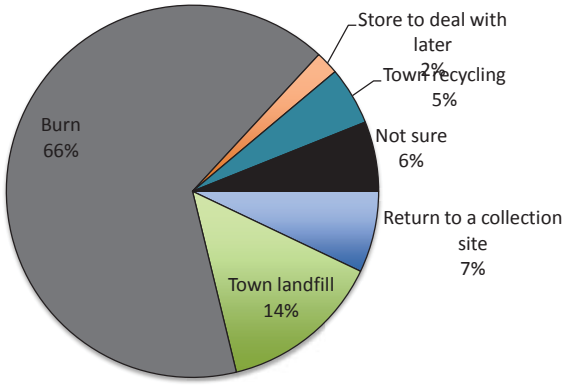
What is done with plastic wrap from silage or hay bales?

Portion of farmers who have: 16%
N=48



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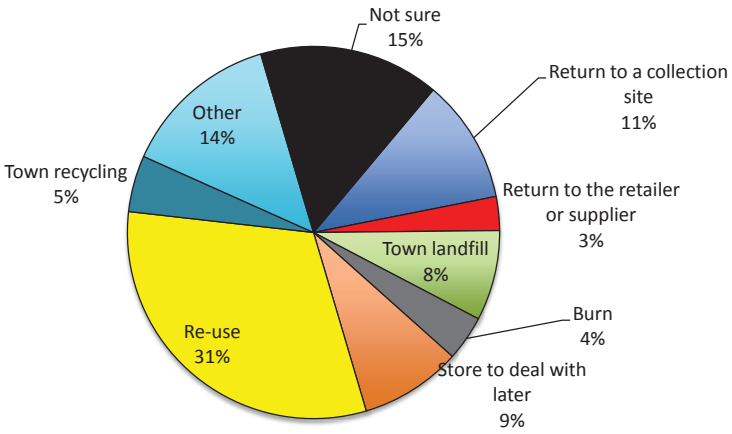
What is done with used grain bags

Portion of farmers who have: 11%
N=33



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Summary – main ways farmers dispose of each waste material

N=300	Percent who have	Main ways they dispose of this material (Percent of farmers who mention first)
Waste oil and filters	95%	Collection site (33%), town recycling (12%), private waste removal (12%), town landfill (9%), burn (8%)
Plastic oil or antifreeze containers	89%	Town landfill (24%), collection site (23%), burn (17%), town recycling (15%)
Unwanted tires	83%	Town landfill (25%), collection site (24%), town recycling (15%), store to deal with later (15%)
10 litre size range containers	77%	Return to a collection site (89%)
Empty seed bags	71%	Burn (58%), town landfill (13%)
Cardboard packaging from pesticides	69%	Burn (53%), town landfill (18%), town recycling (15%)

Continued…

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Summary – main ways farmers dispose of each waste material

N=300	Percent who have	Main ways they dispose of this material (Percent of farmers who mention first)
Cardboard packaging from other ag products	63%	Burn (59%), town landfill (18%), town recycling (15%)
Plastic wrap or packaging from ag products	62%	Burn (44%), town landfill (33%), collection site (11%)
Used twine or net wrap	43%	Burn (65%), town landfill (19%)
Paint and solvents	42%	Collection site (30%), town landfill (24%), store to deal with later (23%)
Sharps or needles	40%	Town landfill (41%), store to deal with later (17%), collection site (13%)
Used antifreeze	39%	Collection site (23%), store to deal with later (21%), reuse (17%)

Continued…

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Summary – main ways farmers dispose of each waste material

N=300	Percent who have	Main ways they dispose of this material (Percent of farmers who mention first)
Unwanted pesticides	31%	Collection site (33%), store to deal with later (21%), return to supplier (16%), wait to take to collection site (11%)
Drums, totes, shuttles	28%	Return to retailer (77%)
Styrofoam	28%	Town landfill (49%), burn (30%)
Empty feed bags	25%	Burn (57%), town landfill (15%)
Animal health products	23%	Town landfill (26%), Collection site (17%), return to supplier (12%), burn (12%), store to deal with later (12%)

Continued…

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Summary – main ways farmers dispose of each waste material

N=300	Percent who have	Main ways they dispose of this material (Percent of farmers who mention first)
Empty containers from livestock cleaning products	19%	Town landfill (26%), collection site (26%), burn (20%)
Used plastic wrap from silage or hay bales	16%	Burn (66%) Town landfill (14%)
Used grain bags	11%	Reuse (31%), not sure (15%), collection site (11%), store to deal with later (9%)

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Summary of possibly detrimental methods of disposal

Following are the waste materials that may be being stored or disposed of in less than ideal and potentially hazardous ways:

- Storing on farm – having some products stored on farm may create hazards such as fire, leakage, etc. The materials with the highest portion storing them on farm include: sharps and needles, antifreeze, pesticides, paints and solvents, unwanted tires
- Burning – The materials with the highest portion burning them include: seed bags, plastic wrap, cardboard packaging, twine or net wrap, feed bags, plastic silage and bale wrap, Styrofoam packaging
- Farm or town landfill – plastic oil or antifreeze containers, tires, plastic wrap and packaging, paints and solvents, sharps or needles, Styrofoam packaging, animal health products, livestock disinfectant containers

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Differences between segments in how they dispose of waste

The following differences are seen in responses between the various regions or farm types:

- 100% of respondents in Winnipeg North and Interlake return their empty large totes and drums to the supplier or retailer.
- Farmers in NW Manitoba are more likely to take their cardboard pesticide containers to the landfill, whereas those in South Central and SE Manitoba are more likely to burn them.
- Those in Winnipeg North and Interlake are less likely to burn cardboard containers (for pesticides or other ag products) and more likely to put them into town recycling. They are also less likely to burn Styrofoam and more likely to put it in the town landfill. They are less likely to burn empty feedbags and used twine or net wrap. They are also more likely to return used antifreeze and waste oil and filters to a collection site.

Continued…

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Differences between segments in how they dispose of waste

- Farmers in South Central Manitoba are more likely to burn their cardboard containers from pesticides and other ag products.
- Those in SW Manitoba are more likely to burn plastic wrap from ag products.
- Those in Western Manitoba (SW and NW) are more likely to take unwanted tires to the town landfill.
- Farmers in South Central Manitoba and those with over 5000 acres are more likely to have a private waste removal service take their waste oil and filters.

The regional differences may reflect differing levels of public pressure or municipal regulations regarding burning. They may also reflect differing access to municipal facilities.

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Attitudes towards responsible disposal of agricultural waste

Respondents were asked a series of agree-disagree questions to explore their attitudes about disposal of agricultural waste. As seen on the next two slides:

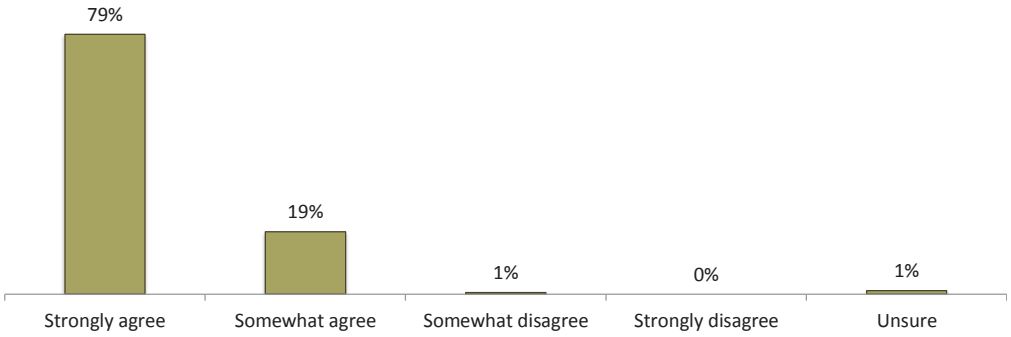
- Farmers consider this to be a highly important issue, with 98% agreeing that responsible disposal of agricultural waste is very important, and 79% strongly agreeing.
- While a high portion generally agree that the agricultural industry is doing enough to ensure that there are responsible ways to dispose of their products, agreement is "moderate" with 42% strongly agreeing and 42% somewhat agreeing. Further, 15% disagree (5% strongly and 10% somewhat) that the industry is doing enough.
- One in five farmers have waste materials on their farm of which they are unsure of how to safely dispose.
- About six in ten farmers say they are not comfortable burning or putting certain wastes in the landfill, but don't see an alternative. This seems to indicate a significant level of engagement and concern about this issue.
- We do not see any differences in these attitudes, based on region, farm size or type of farm.

70

BlacksheepStrategy

Attitudes towards responsible disposal of agricultural waste

Responsible disposal of agricultural waste is very important to me (N=300)

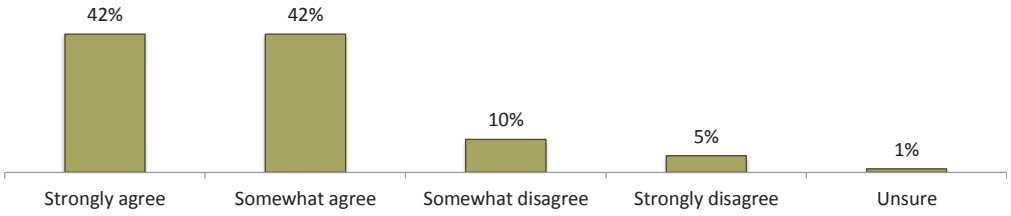


71

BlacksheepStrategy

Do farmers think industry is doing enough?

The agricultural industry is doing enough to ensure there are responsible ways to dispose of the waste from their products (N=300)



72

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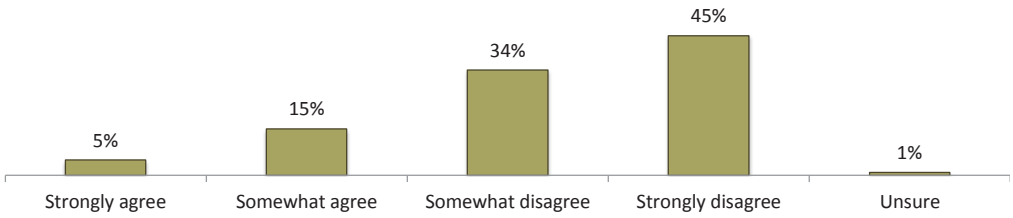
Do farmers have waste that they don't know how to dispose of safely?

I have a lot of waste materials around my farm that I am unsure of how or where to safely dispose of (N=300)



73

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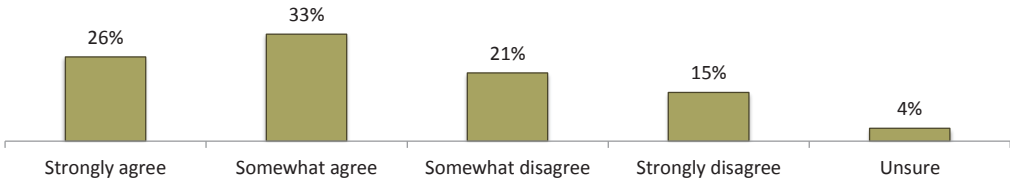
Do farmers see alternatives to landfill or burning?

I am uncomfortable burning or putting certain products in my own or other landfills, but don't see any alternative (N=300)



74

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Do farmers have materials they don't know how to dispose of?

About a quarter (24%) of farmers mentioned specific waste materials that they are not sure how to safely dispose of. Respondents mentioned a variety of materials that they are concerned about, with 3% - 4% mentioning each of

- Plastic wrap
- Twine
- Treated seed / fertilizer / canola seed
- Pesticides
- Antifreeze
- Paint and solvents

75

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Do farmers have materials they don't know how to dispose of?

Do you have any material on your farm that you are concerned about recycling or safely disposing of, or that you are unsure of how to dispose of? (N=300) *	
Plastic wrap and film, silage wrap, bale wrap	4%
Twine	4%
Canola seed, fertilizer, treated seed	4%
Chemicals, pesticides	3%
Antifreeze	3%
Paint and solvents	3%
Oil	2%
Tires	2%
Containers	2%
Animal health items	1%
Oil filters	1%
Other	2%
Nothing, no concerns, don't know	76%

* Percentages add to more than 100, as respondents could give more than one response

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CleanFARMS Manitoba Farmer Survey

Container Recycling

77

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Awareness of Container Recycling Program

Among those farmers who generate 10L size-range containers, 94% are aware that there is a collection and recycling program for these containers. This is up slightly from a 2009 survey that showed that 88% of Manitoba respondents were aware of the program.

Of these, 95% know where they can take their containers (similar to the portion in 2009).

Most (93%) have 25 km or less to drive to get to their collection site, while another 7% have to drive 26 – 50 km. The vast majority (93%) feel that their collection site is a reasonable distance away.

- There are no statistical significant regional differences in how far there is to drive to the container recycling depot.

78

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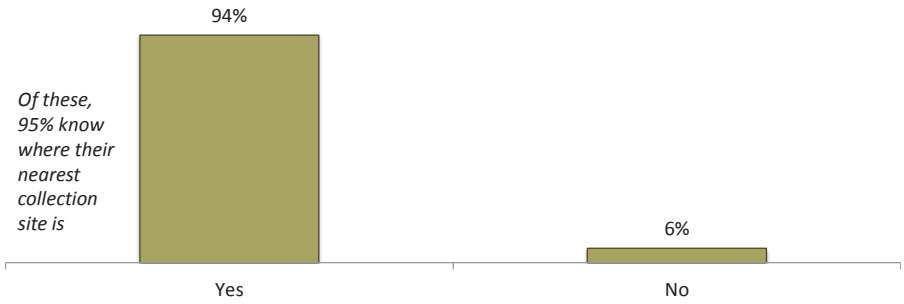
Awareness of container recycling program

Before now, were you aware that there is a collection and recycling program for these containers? (N=230, those who generate containers)



Of these, 95% know where their nearest collection site is

79

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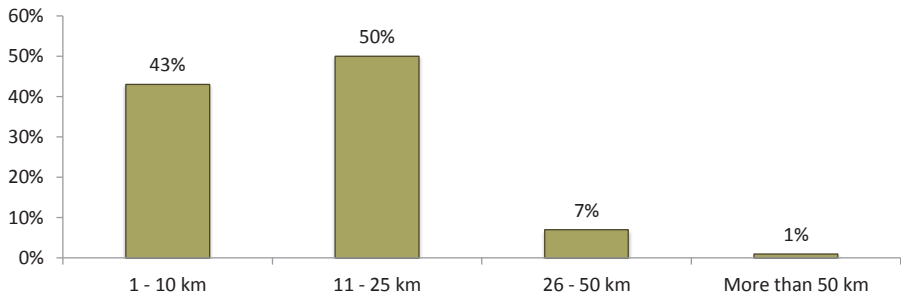
Distance to drive to return containers

About how far would you have to drive to return containers? (N=202, those who have containers and know where their collection site is)



80

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How are 10 litre containers disposed of?

As seen on the following two slides:

- 92% of farmers return at least some containers to a collection site. This does not differ from the results of the 2009 survey.
- About 12% of farmers save up some of their containers to deal with later.
- Seventeen percent (17%) of farmers reuse some of their containers, up from 7% in 2009.
- About 13% burn some of their containers. This is similar to the portion in the 2009 study.
- Some containers also get taken to the landfill, with about 6% of farmers saying they do this with some containers.
- The PRIMARY way that farmers deal with their containers, or the way they mention first, is to take them to a collection site, with 89% saying this is the main way (this is identical to the 2009 result). Only small portions say the primary way the deal with their containers is to bury or burn them, and this has not changed since 2009.

81

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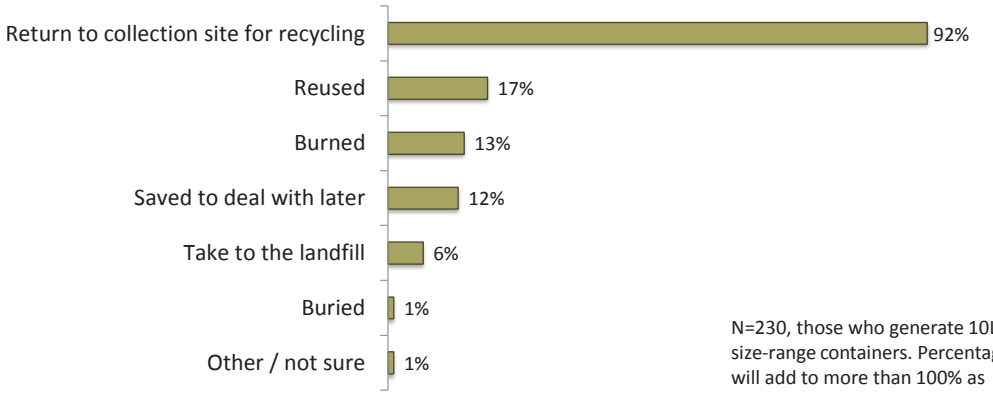
Various ways that farmers dealt with their containers over the past year (total mentions)



N=230, those who generate 10L size-range containers. Percentages will add to more than 100% as multiple responses were allowed

82

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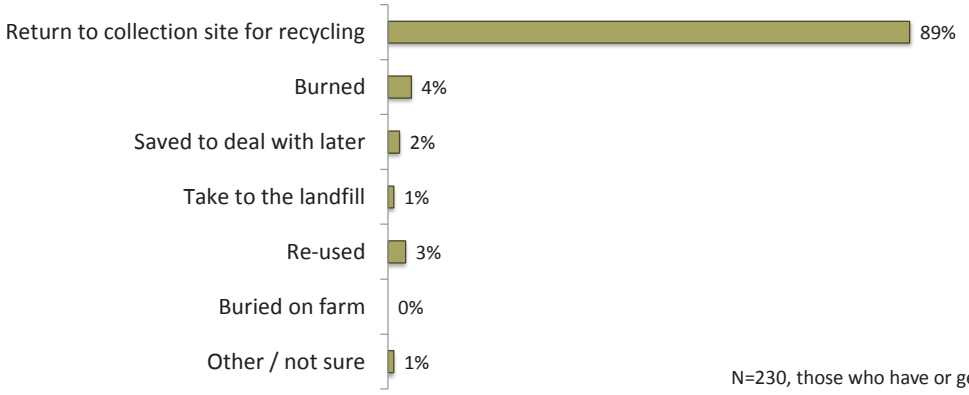
Main way that farmers dealt with their containers over the past year (first mention)



N=230, those who have or generate 10L size-range containers

83

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What motivates farmers to take their containers to be recycled?

The following slide shows that over a third (35%) of farmers who return their containers are primarily motivated by a desire to be environmentally responsible – they feel that returning containers is just "the right thing to do." Another 8% cite a related reason of liking the idea of recycling and making something new out of the used materials.

About a quarter (26%) return their containers because it is simple for them to do so. Basically, it is more convenient to return the containers than to do anything else with them.

About one in five return their containers because it cleans up the farm and frees up space.

About one in ten want the containers off their farm due to safety concerns.

There is a group who say they return their containers because they don't like the alternative of burning (10%) or putting them in the landfill (4%).

Only a small portion of farmers are motivated to return their containers out of a feeling of compulsion or fear of breaking the law (3%).

84

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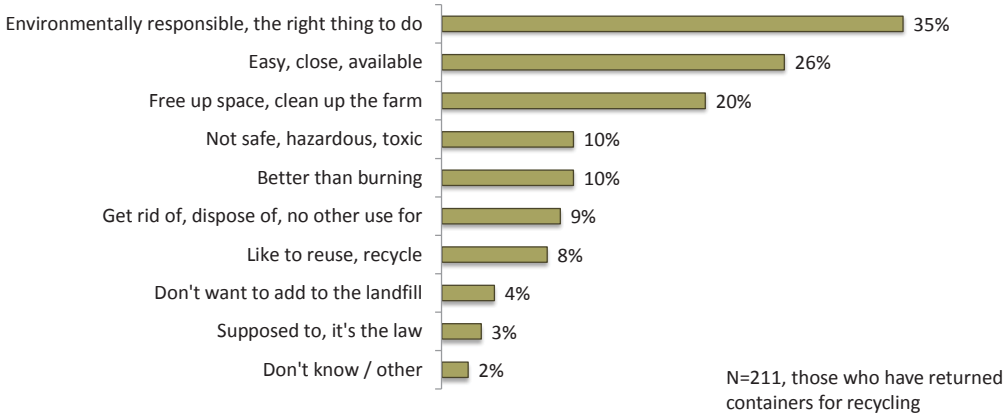
What motivates farmers to take their containers to be recycled?



N=211, those who have returned containers for recycling

85

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Sample comments – reasons why farmers recycle containers

Environmentally responsible

"Clean up the earth and its a good thing to do."

"I feel responsible for it."

"Makes good sense for environment."

Easy, close, available

"I know they take them, it's right there in town."

"Just as easy to take them there as to deal with them yourself."

"There is a recycling site nearby, this seems the most logical way to dispose of them"

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Sample comments – reasons why farmers recycle containers

Free up space, clean up the farm

- "We like a clean yard."
- "Don't like to see them lying around - makes sense."
- "Don't like a big mess in the yard, so we get rid of them the right way."

Not safe, hazardous, toxic

- "It's the proper thing to do, they can be poisonous."
- "I just don't want them around my kids."
- "I don't want to pollute the land or bush."

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Sample comments – reasons why farmers recycle containers

Better than burning

- "Better than burning no toxic fumes in the air."
- "Just don't like the idea of putting them up in smoke and don't want it going up in the air."
- "It is a hassle to burn them...more simple to throw them in the truck and take them over there."

Like the idea of re-using, recycling

- "So they can be recycled and used for something good."
- "Be reused to make something new rather than just take up space."
- "It's the clean way of doing it. They will get reused for something."

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Portion of containers recycled

As seen previously, three-quarters of farmers in Manitoba generate 10L size-range plastic pesticide containers on their farms.

- Of these farmers, we saw that 92% return at least some jugs for recycling.

We asked farmers about what portion of their jugs they return for recycling.

Including all farmers who generate these jugs and considering those who don't return any as well as those who return some or all, on average 89% of jugs are returned.

As seen on the following slide, just over two-thirds (67%) of Manitoba farmers return 100% of their jugs. However, about a third return less than 100%, and 7% don't return any.

These results do not differ significantly from 2009 prairie-wide results, in which it was estimated that 86% of containers were returned (across the prairies), 60% returned all of their containers, and 4% didn't return any.

89

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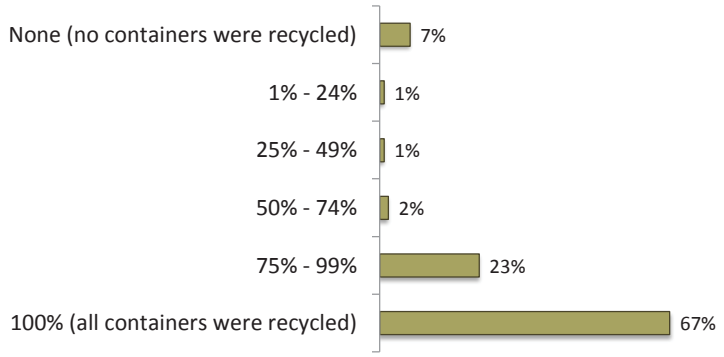
Portion of containers recycled



N=228, those who generate 10L size-range containers

90

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Which segments are more or less likely to return containers?

Those whose operations are "primarily livestock," but who do generate 10L containers on their operation, are less likely to return empty containers. About 44% return 100% of their containers (compared to the 67% average). We would expect, however that these type of operations might typically produce fewer containers.

There are no other significant differences based on region, age or farm size.

91

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Why do farmers who return some containers not return 100% of their containers?

Those who do not return 100% of their containers were asked why. About six in ten who don't return all their containers (57%) say that they reuse some of their containers.

Another 16% said they didn't return some containers because it was easier to burn the containers than return them, while 11% said there were too many containers to return them all.

A small number gave other responses, with several of these saying that some of the containers still have pesticide in them that might be used in the future.

92

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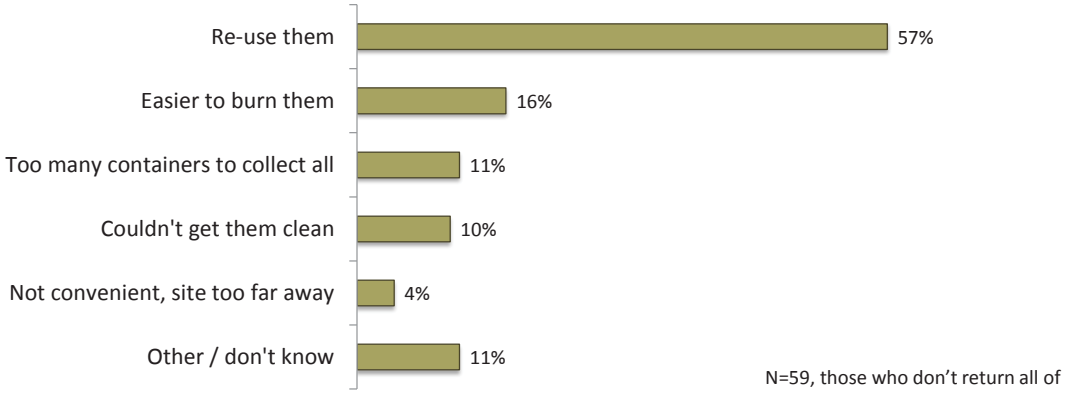
Why do farmers who return some containers not return 100% of their containers?



N=59, those who don't return all of their containers

93

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What are containers re-used for?

With "reuse" being the main reason that not 100% of containers are returned, we looked into the responses as to what they are being used for. Following are some of the responses:

- Holding oil or fuel
- Still have pesticide in them / store other pesticides in them
- Use for other things
  - "Every once in a while we use as weights to hold tarps."
- Re-use, use for storage
- Holding water

94

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Why do some farmers not return any containers?

Only 7% of those who generate 10 litre containers do not return any containers (a small sample size of 19 farmers).

Of this small number, the largest portion say that it is not convenient for them to return containers or that their collection site is too far away.

Some of these actually do return their containers to a retailer (although they said they don't return containers to a recycling or safe disposal location). Therefore, it is possible that the 7% figure is overstated and there are very few that don't return any of their containers.

95

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What would encourage farmers to return more containers?

When those who return some containers but not all were asked what would encourage them to return more containers, the largest portion of respondents were uncertain what would motivate them to return more containers (recall that many of these are reusing the containers that they don't return).

Of those who do have a suggestion, the largest group (10%) mention having closer sites. This is echoed by those who don't return any containers – about 40% of those who don't return any containers mention that closer and more convenient sites would help them to return more containers.

Other suggestions, given by small portions of respondents, were to let farmers return the containers "as is," and a few others suggested on-farm pick-up or having an incentive to return containers, or taking the cardboard packaging along with the containers.

96

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What would encourage farmers to return more containers?

The largest portion of suggestions relate to having closer or more convenient sites.

- This is supported by analysis showing a strong correlation between distance to site and portion of containers returned:
  - Of those who know where their collection site is and the collection site is 10 km or less away, 93% of their containers are returned.
  - For those whose site is 10 – 25 km away, 90% of containers are returned.
  - For those whose site is 26 km or more away, 70% of containers are returned.
  - Correspondingly, the closer the site, the more likely the farmer is to return 100% of his containers.

97

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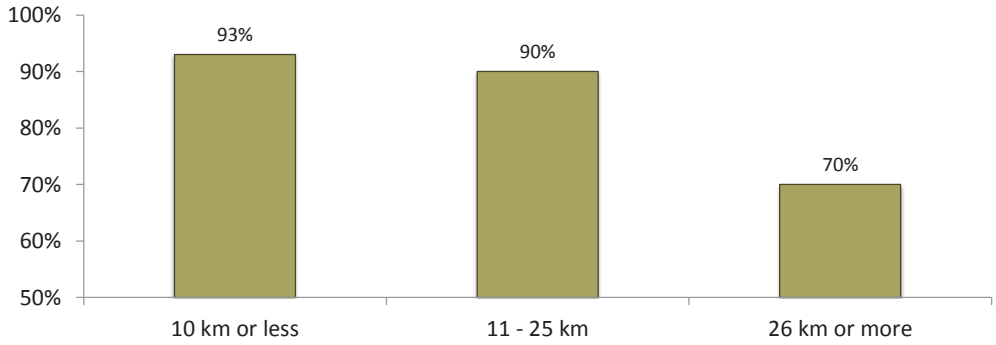
Portion of containers returned by distance to collection point



N=202, those farmers who are aware of program and know where their recycling point is

98

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Attitudinal factors that affect the return of containers

A number of agree-disagree statements were read to respondents to measure attitudes related to container recycling.

The statements with the highest level of agreement included:

- The greatest benefit of returning containers is a clean yard and a clean farm
- Returning and recycling containers demonstrates that you have good stewardship practices
- I have a pretty good system for collecting up my containers and returning them

There is low agreement with:

- If containers can't be cleaned properly, you're better off not to return them (only 19% agree)
- If I burned containers on my farm, it would not affect my neighbours (about a third agree)

All of the positive statements (see next slide) correlate with whether or not farmers are returning their jugs.

99

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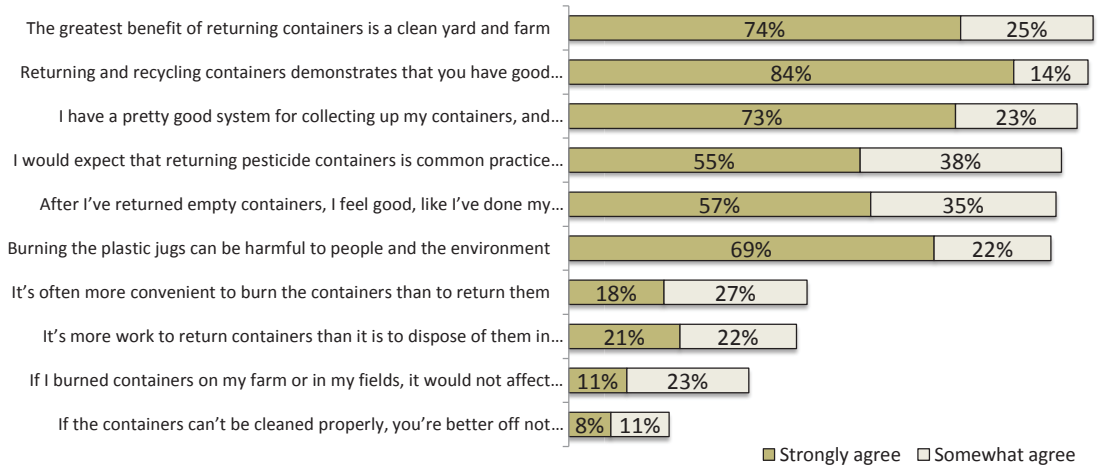
Attitudinal factors that affect the return of containers



100

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Differences in attitudes between segments

There are few statistically significant differences in attitudes between segments. However, we do see the following:

- Those in Southeast Manitoba are more likely to have a good system for collecting and returning their containers, as are those with higher acreage.
- Those with livestock are more likely to strongly agree that the greatest benefit of returning containers is a clean yard and farm.

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CleanFARMS Manitoba Farmer Survey

Unwanted Pesticides

102

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Unwanted pesticides currently on farm

	Portion who have (N=300)	Average number
Containers	9%	14
Litres	15%	31
Kilograms	1%	6
Gallons	1%	13

- As previously noted, about 31% of respondents generate unwanted pesticides in a typical year or have unwanted pesticides on their operation. Respondents estimate that about 93% of the unwanted pesticide is liquid, and 7% is dry.
- As seen above, much of this is in containers or liquid form. Extrapolating these numbers, we estimate Manitoba farmers have approximately 277,000 litres plus 900 kg of unwanted pesticide on farm. This is a midpoint of a range, and when we apply the margin of error to these numbers, we obtain a range of between 194,000 and 360,000 litres and 100 and 1,700 kg.

103

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How old are the unwanted pesticides?

As seen on the next slide, about half of farmers with unwanted pesticides say these pesticides are 3 years old or less, while about half have pesticides that are more than 3 years old.

104

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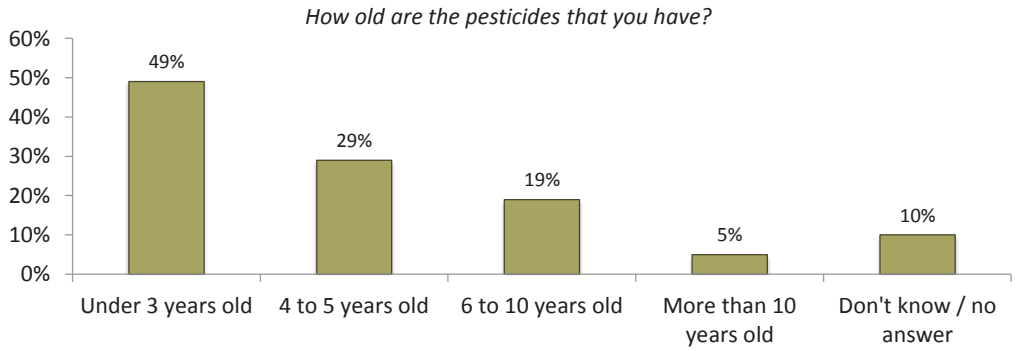
How old are the unwanted pesticides?



N=83, those with unwanted pesticides. Percentages add to more than 100, as respondents could have pesticides in more than one age category

105

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Awareness of pesticide collection program

The next slide shows that the vast majority of farmers who have unwanted pesticides are aware of the pesticide collection program. Only 6% of all respondents had unwanted pesticides but were not aware of the program.

106

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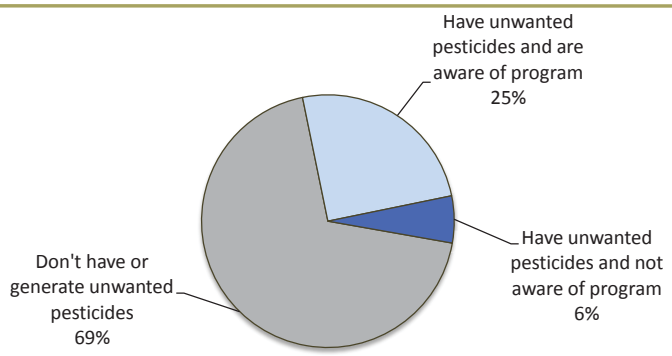
Summary of portion who have unwanted pesticides and awareness of program



N=328, the entire sample

107

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Likelihood of using the pesticide collection program among current non-users

Among those who had unwanted pesticide who did not say they would dispose of it through the program, about two-thirds (65%) said they would be interested in the program and another 20% said they would be somewhat likely to use it. Only 12% said they would not be likely to use it.

Of those who said they would not use the program, all said that they would plan to eventually use the pesticide.

108

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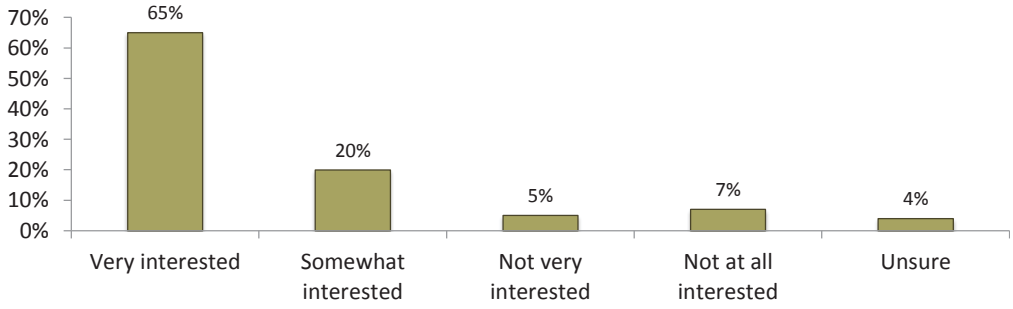
Likelihood of using the pesticide collection program among current non-users

How interested are you in being able to dispose of obsolete pesticide through this program, if it was in a convenient location?



N=49, those who didn't mention returning their pesticide through the return program

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How often should a pesticide collection program be run?

Respondents who typically generate unwanted pesticide, or who have some on their farm currently, were asked how often they would accumulate enough unwanted pesticides that they would want to dispose of them. About a third said that they would want to dispose of unwanted pesticides every 2 to 3 years, while another third said every 4 to 5 years. Only about one in ten (9%) said they would generate enough pesticides that they would want to be able to dispose of them every year.

110

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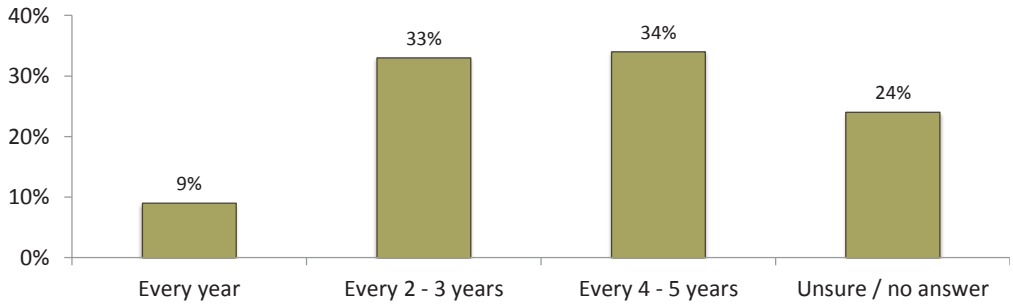
How often should a pesticide collection program be run?

How often would you accumulate enough unwanted pesticide that you would like to dispose of it?



N=93, those who have unwanted pesticide on their farm, or generate it in a typical year

111

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CleanFARMS Manitoba Farmer Survey

Communications

112

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How are farmers most likely to find out about recycling or safe disposal programs?

Farmers were asked an open ended question about where they are most likely to find out about recycling or safe disposal programs. As seen on the following slide, the most common responses were: farm newspapers, radio, and brochures / flyers. There were no statistically significant differences in responses between segments (acreage, region, farm type).

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How are farmers most likely to find out about recycling or safe disposal programs?

How are you most likely to hear about recycling and waste disposal programs? (Open-ended responses) (N=300)	First mention	Total mentions*
Farm newspapers	38%	54%
Radio	10%	23%
Brochures, flyers	8%	16%
Crop input retailer	6%	12%
Provincial extension, government	6%	10%
TV	3%	10%
Farm magazines	6%	9%
Other farmers	5%	8%
Mailed information	3%	7%
Chemical company reps	3%	4%
On line	1%	2%
Other	5%	8%
Don't know	7%	7%

* Percentages for total mention add to more than 100, as multiple responses were allowed

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Usefulness of various information sources

Respondents were read a list of various information sources and asked to rate the usefulness of each. Farm newspapers and magazines are most highly rated, followed by crop input retailers. Other farmers are also seen to be a useful source of information.

There are only a few differences between segments in ratings of the usefulness of the information sources:

- The larger the farm, the higher they rate the usefulness of trade shows.
- Those in the larger acreage categories are more likely to consider online websites to be somewhat or very useful.

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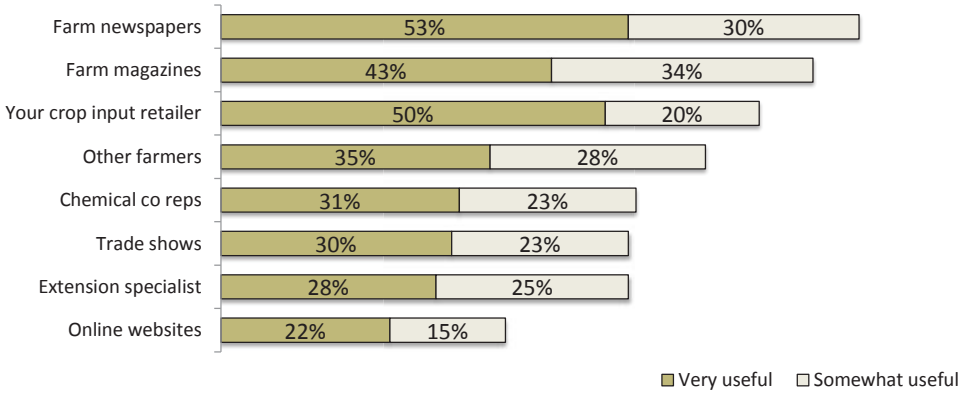
When you want to learn about issues that can affect your farm, how useful are the following information sources?



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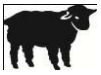

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Appendix C – Extended Producer Responsibility Primer

PRIMER
for
Extended Producer Responsibility

Closing the Loop on Agricultural Waste

Shifting Responsibilities and Expanding Opportunities for Manitoba Farm Waste

March 10, 2011

Closing the Loop on Agricultural Waste

Shifting responsibilities and expanding opportunities for Manitoba farm waste

Across Canada, provincial governments are rapidly implementing new regulations aimed at getting more waste materials recycled. These regulations go beyond household recycling programs to target specific sectors and types of waste. These new regulations and policy instruments are intended to:

1. Increase recycling of wastes into valuable new products;

2. Ensure the safe disposal of non-recyclable waste; and

3. Shift the financial responsibility of waste management from municipalities and taxpayers to producers of a product and give the producers the incentive to design the product or packaging with consideration of end-of-life management.

The purpose of this document is to help members of Manitoba's agricultural sector understand how they are affected by regulations and how public policy for new recovery programs could affect the industry. This document explores how a stewardship program to manage these materials may take shape.

To determine the size and scope of the Manitoba agricultural sector's waste, CleanFARMS™ has completed a series of waste characterization studies in Manitoba, which provide some baseline data. The data identifies most of the packaging and waste materials generated on farms like boxes, cartons, bags, twine, bale wrap and silage film. Some of these materials are currently recycled, but some are not. While the largest volume of waste on Manitoba farms is paper and paperboard waste, plastic waste is often considered one of the most problematic materials currently managed by farmers. That is because many of the plastic wastes, such as grain bags and bale wrap, are bulky and difficult to manage. Burning these products on the farm results in high levels of air pollution. If these products were collected and recycled, tonnes of greenhouse gases could be avoided, airborne and land based pollution reduced while supporting local recycling industries that manufacture value-added products.

This project is being undertaken by CleanFARMS™, a non-profit industry stewardship organization committed to environmental responsibility through the proper management and disposal of agricultural waste. CleanFARMS™ programs are world-renowned and manage crop protection waste from farms across Canada.

What is Extended Producer Responsibility (EPR)?

EPR requires producers to be responsible for end-of-life management of any waste that is generated from the use of their products. In the agricultural sector this could include waste packaging like empty pesticide containers, cardboard as well as other waste products like used tires, bale wrap, twine, vaccines, pharmaceuticals, old sharps, and other non-organic waste.

In Canada, EPR policies usually assign the responsibility to the producer or the first importer that sells a product in a region (province, territory or country). These producers or importers are called 'Stewards' of the designated product.

The intent of these policies is usually two-fold: 1) to ensure designated products are properly managed at the end of their useful life; and, 2) to give a steward a financial incentive to make their products cheaper to manage at the end of their useable life, which usually translates into better environmental performance.

Good EPR programs are designed to ensure that an effective collection and recycling/disposal program is in place so that as much material as possible is collected, and then re-used or recycled.

One example of a voluntary EPR program is the empty pesticide container recycling program, administered by CleanFARMS™. As of 2009, the program had collected and recycled over 83 million empty commercial-class pesticide containers from Canadian farmers. Commercial users of pesticides return their empty containers to any one of about 1,000 designated sites across Canada. The program ensures that collection sites, contractors and processors meet strict health, safety and environmental standards. All costs for the program are borne by the manufacturers or importers of the products and about 63 percent of all containers are recovered.

Instead of filling our landfills, the CleanFARMS™ program has prevented more than 68,000 tonnes of greenhouse gas emissions from entering the atmosphere - this is equal to taking more than 13,000 cars off the road or saving the emissions generated from powering 6,000 homes for a year. Materials that cannot be recycled, such as obsolete pesticides, were also collected and safely disposed through CleanFARMS™ programs.

What EPR programs exist in Manitoba?

Currently the province of Manitoba has a series of programs in place designed to manage and finance environmentally sound end-of-life management of waste materials. The following table summarizes existing provincial programs, some of which target materials generated on farms in the province. Some of these programs are voluntary as opposed to mandated.

MATERIAL	STEWARDSHIP ORGANIZATION	COLLECTION	FINANCING	WEBSITE
Packaging and Printed Paper Materials, including boxboard, cardboard, laminates, newspapers and magazines, containers, aluminum cans etc.	Multi-Materials Stewardship Manitoba (MMSB)	Material is collected through the municipal curbside collection system as well as through some municipal depots in smaller communities	20% of the net costs are covered by municipalities, and 80% of the net costs are provided directly by industry brandowners & first importers.	http://www.stewardshipmanitoba.org/
Scrap Tires	Tire Stewardship Manitoba	Material is brought to collection sites by users	Tire consumers are charged an advanced disposal fee (ADF)which is used to finance the entire program.	http://www.tirestewardshipmb.ca/
Used Oil, Oil Filters and Containers	Manitoba Association for Resource Recovery Corporation	Material is brought to collection sites by users	Financed by product manufacturers and usually passed down through to the consumer.	http://www.usedoilrecycling.com/en
Prescription drugs, such as antidepressants, pain medications or blood pressure medicine in pill, capsule, liquid or cream. VOLUNTARY	Post Consumer Pharmaceuticals Stewardship Association	Material is brought to pharmacies by users	Financed by product manufacturers	http://www.medicationsreturn.ca/
Rechargeable batteries and cell phones. VOLUNTARY	Call2recycle	Material is brought to collection sites and retailers by users	Financed by product manufacturers	http://www.call2recycle.ca/
Obsolete Pesticides and Empty Pesticide Containers. VOLUNTARY	CleanFARMS™	Materials are brought by users to collection sites where they are processed and safely disposed of (obsolete pesticides) or transported to recyclers (containers)	Financed by product manufacturers	http://www.cleanfarms.ca/

There are also new laws that may be coming into force very soon. There are currently proposed regulations for wastes such as household hazardous material waste and electronic waste. The following table illustrates some materials that may soon fall under provincial regulation and the organizations that have proposed stewardship plans to manage them.

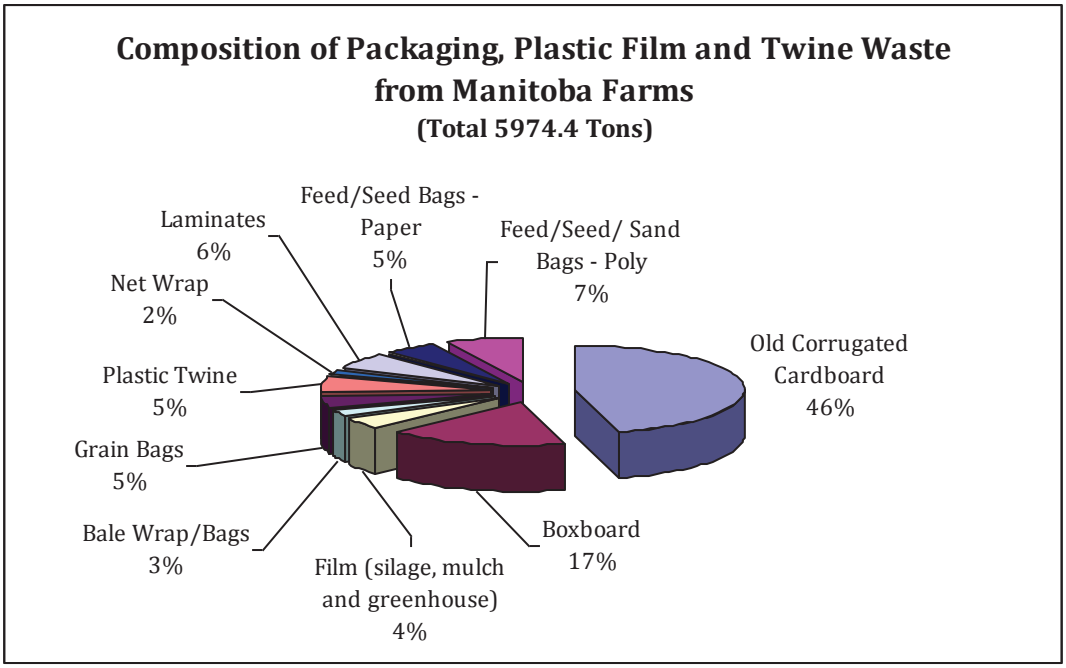
MATERIAL	STEWARDSHIP ORGANIZATION	COLLECTION	FINANCING	WEBSITE
Paints , Fluorescent Lighting Tubes and Compact Fluorescent Lights	Product Care	Plan awaiting approval	Plan awaiting approval	http://productcare.org/Manitoba
Waste Electronics and Electrical Equipment	To be determined	Plan awaiting approval	Plan awaiting approval	http://productcare.org/Manitoba
Mercury-containing thermostats	Summerhill Group – Switch the 'stat	Plan awaiting approval	Plan awaiting approval	http://www.switchthestat.ca/eng/index.php
All Batteries	Call2recycle	Material is taken to collection sites by users	Financed by product manufacturers	http://www.call2recycle.ca/

Why is agricultural waste a concern?

Sustainable farming in Manitoba means reducing the impacts of pollution through the reduction, reuse and recycling of products and materials that end-up as garbage on farms. No products should end-up being buried or burned on a farm because in most cases there are safer and more environmentally preferable management options available like reuse and recycling. To better understand the scope of materials for consideration, the following results from a recent waste characterization study highlights the variety of non-hazardous materials generated on farms.

Currently, the Packaging and Printed Paper (PPP) stewardship regulation (195/2008) enacted under the Waste Reduction and Prevention (WRAP) Act includes corrugated cardboard, boxboard, laminates and other packaging. Therefore, these materials are by default currently being managed by Multi-Material Stewardship Manitoba (MMSM) through their packaging and printed paper stewardship plan.

The remaining materials are made-up of seed, feed, and sand bags; grain bags; plastic twine; bale and net wrap; and plastic film. These materials are the focus of this paper in terms of evaluating available stewardship options.



Do recycling markets exist for these materials?

In spite of limited recycling markets for many waste materials in Manitoba, the vast majority of packaging, film and twine materials generated in the agricultural sector are recyclable. However, recycling markets do rely on consistent quantities; limited levels of contamination; and may require funding in order to make recycling economically feasible.

What policy instruments should be considered to manage the materials?

For effective and sustainable solutions to the problems that arise from agricultural wastes, there are a number of policy instruments which can be applied in a coordinated manner to collectively achieve the goals of waste reduction and proper end-of-life management. These policy instruments are important components of an effective recovery program – each offering their own level of support for the collection models to be effective.

The following provides a brief description of the policy mechanism available to help manage agricultural wastes in Manitoba. These can be used in combination with a collection program.

Landfill/Disposal/Burning Bans prohibit disposal, burning, or burial of targeted materials based on waste source, waste type, or properties. Several Canadian landfills and one province (Nova Scotia) have implemented bans on materials such as tires, fill materials, solvents, flammable liquids, gasoline, pesticides, electronic products and others. Introducing landfill bans and a ban on burning of certain agricultural waste that have convenient collection systems in place can support increased participation. However, to be effective a high level of program awareness and enforcement is required.

Eco-Labelling can be a mandatory labelling requirement used to help consumers (in this case: farmers) better understand how to properly manage their packaging waste. Labelling can identify how and where the material should be managed. Labelling can be supported directly by Manitoba-based distributors and/or retailers through measures such as applying stickers products; providing in-store brochures; etc.

Disposal levies and Taxes encourage recycling instead of disposal by applying a tax to landfilling or incinerating targeted materials. Disposal levies and taxes are an additional fee charged on-top of the disposal tip fee. While the levy can be used to generate revenues for the recycling or stewardship program, it is also used to close the economic gap between cheap disposal and more costly recycling. As with landfill bans, this type of instrument can only be effective if there is a high level of awareness around the diversion options available to farmers, otherwise it will simply be additional cost. This option can also lead to increased on-site burning.

Product Bans are an outright prohibition of sale of a particular product. Several cities worldwide have now banned one-time use plastic bags and household pesticides. This policy approach can be useful if a product alternative exists. For example, if there is a recyclable alternative available for packaging, such a ban can be effective..

Minimum Product Standards encourage increased quality in recycled products which can result in recycled products substituting virgin recourses. This instrument can be used in a program to ensure that all streams of agricultural packaging are compatible with each other for recycling.

What are the collection options for agricultural farm wastes?

As producers and farmers consider the various methods of collection available in Manitoba, central to the discussion and for consideration is:

1) WHAT: What is the material being considered (amount; size/volume; and handling issues);
2) WHERE: What type of location will accept the materials (municipal landfill site/depot; private depot; retail; pick-up); and
3) WHEN: How often is the collection program offered (seasonal or on-going).

The following eight collection options are presented for consideration. These options are not mutually exclusive, and in fact, could be most efficient when utilized in combination with each other. These options are presented to help the agricultural community understand all the collection options available and provide feedback on them.

1. Collection through existing municipal sites

Currently, there are approximately100 municipal landfill sites in Manitoba where farmers can drop off their empty pesticide containers. If new materials are to be managed under EPR programs, some could be collected at these same sites.

This option involves the farmer driving these recyclables to existing facilities for drop-off. This option is currently offered by participating municipalities, but can be further expanded and improved through a stewardship program. These locations may not be suitable for all wastes from farms. For example, larger waste materials such as used grain bags and bale wrap may be difficult for these collection sites due to their limited storage space and distance from markets.

There is a strong likelihood that Manitoba will be closing some of its landfills over the next two decades. This could affect the convenience to farmers of this collection method. Additional depot sites would be required to ensure convenient coverage and on-going participation.

This collection method would work best if paired with an enforced disposal/burning ban.

2. Return to Retail

This method of collection is considered convenient for farmers because it is assumed that they are driving to these locations already and it is available to them whenever the retailer would be open. The retailers can arrange to have the returned materials removed and properly disposed of when sufficient volumes have developed.

The retailer, however, may object to being used as a collection site, particularly for products they do not sell. Therefore some other motivation may be required to get retailers involved, such as financial compensation.

There are approximately 100 agricultural retailers in the province that sell a wide range of agricultural goods. If these dealers were to be used as collection sites they would provide comparable geographic coverage to the municipal landfill sites.

3. Mixed Model – Municipal and Agricultural Retailer Sites

This collection model combines the first two options. Different materials can be assigned to different locations based on frequency required, convenience and practicality. For example, if retailers are designated as stewards, it would be logical for farmers to bring empty feed, seed, sand and fertilizer bags back to the point of purchase. This makes more sense in light of the fact that there is a need to sort bags up-front because upwards to half of the seed bags will be contaminated with insecticide or herbicide.

For items like twine, bale wrap and plastic film from silage, greenhouses and mulch, it may be more practical for farmers to take them to municipal sites. These materials can be bulky and more difficult to handle for retailers who may not want to dedicate their space and labour to handle these items, especially if they do not sell them and there is a municipal site nearby.

4. Single Stream Collection Blitz

This is a collection event for a specific material at a location such as an agricultural retailer or municipal site. The frequency and duration of the collection period would be determined by the amount of material to be collected and the needs of farmers to dispose of it. This option is utilized for empty pesticide containers, bale wrap and twine in some countries.

Grain bags are so large (20-25 ft wide, 50-100 long) that it is unlikely these could be collected in the same manner as the rest of the materials. They could be collected in annual or twice yearly blitzes. The best schedule would probably be once in the spring when a large percentage of the bags are emptied of grain and a second in the fall to collect the balance. Last spring, a group of 25 Saskatchewan farmers participated in a grain bag collection pilot and collected over 50,000 pounds of bags over a single weekend.

5. Combined Stream Collection Blitz

This is the collection of multiple materials at a location such as an agricultural retailer. The frequency and duration of the collection period would be determined by the amount of material to be collected and the needs of farmers to dispose of it. If multiple materials are collected together it could make the collection of each less expensive on a unit or kg basis.

6. Mobile Farm Supply Pick-Up

This collection method provides pick-up from farms either on a regularly scheduled pickup from farms or as an 'on-demand' service when farmers request pickup. This option is convenient for farmers in that they need not transport the materials away from the farm. The biggest challenge to this option is that it could be very expensive due to the number of collection locations.

7. Mobile Farm Supply Pick-Up – On-site Reverse Distribution

This collection method is similar to #6 above, except that it utilizes a company that is already delivering products to farms. The truck that delivers feed or grain for example, could take back empty feed or grain bags from the farms it delivers to. This option is convenient for farmers in that they need not transport the materials away from the farm and could be cost effective if it is logistically possible for the delivery trucks to remove the materials.

8. Private Collection and Disposal

Farmers contact a private waste disposal company to pick up the wastes as required. This method is likely to be convenient for farmers but it could also be the most expensive and may lead to farmers burning the materials or burying on their own farms to save money.

How would a stewardship program operate?

A program to manage materials produced on Manitoba farms could be either voluntary or mandated by government. This section will present these options for program design.

The first stewardship option is a legislated program which covers products not currently covered under the PPP regulation like twine, film, seed, feed, and grain bags. This will obligate all product producers, "stewards" to participate either through direct retail take-back, or financing of a third party program manger. In a mandatory program all product producers (usually defined as brandowner/first importers) are required to develop and finance a materials management plan. Producers may opt to internalize these costs into their product price or may choose to apply the cost on a unit basis at the point of purchase, similar to the "eco-fees" currently being changed in Manitoba on items like tires, motor oil, and oil filters.

In this case a Producer Responsibility Organization (PRO), such as CleanFARMS™, could represent affected producers and act as the central clearinghouse for program management; fund distribution; accountability and reporting;. PROs are usually made-up of companies (brandowners or first importers into Manitoba) who pay into the program. Generally companies with the largest market share contribute the most make-up most seats on the Board.

A legislated EPR program could succeed in meeting performance targets if it were supported by mandated policy instruments. One such instrument is eco labelling on packaging to educate the consumer on the recyclability of the package and the environmental impacts from improper disposal. Another is a disposal and/or burning ban that discourages burning or burying by making these practices illegal.

Materials can be collected through municipal sties or retail locations (or a combination of the two) for most materials. More difficult-to-manage items could be collected via blitzes or possibly a reverse distribution program where the delivery vehicle takes-back the packaging and/or used products when delivering new products to the farm.

Legislated programs can level the playing field by requiring that all sellers of agricultural products and packaging to participate. Usually legislated programs have Provincial oversight and monitoring and require industry to undertake third party auditing. Legislative programs are considered to have 'teeth", especially when performance targets are to be met.

An alternative to a legislated, mandatory stewardship program is a voluntary program. This would involve engaging a producer Responsibility Organization (PRO), such as CleanFARMS™, to design and run a collection program for designated materials that is paid for by fees charged to producers who agree to act as stewards. Companies interested in voluntarily operating and financing a program recognize that a more cumbersome and costly legislated program can be implemented if the material continues to be disposed of.

In a voluntary program a group of interested companies finance a non-for-profit company to manage, tender contracts, fund, collect data and report on the program. The organization collectively agrees on the share of funds it will pay (usually based on market share). CleanFARMS' empty pesticide container recycling program currently finances a drop-off program available at nearly 100 provincial sites.

A voluntary program could be implemented in stages. Such a program would begin with some materials and then phase in others. An advantage to creating a staged program in this fashion is that it would allow the stewards to get the infrastructure in place to collect, transport, process and find recycling markets for the first materials, and then phase in others in a practical order.

Regardless of whether the program designates all materials or begins with some and phases in others, collection in a voluntary program would likely be similar to collection in a mandatory program where most materials are collected through municipal sties or retail locations (or a combination of the two).

In the case of a voluntary program it may be even more important to support the plan with policy instruments such as eco labelling and a ban on improper disposal.

In a voluntary program, industry is able to design the program the way they want with limited prescriptive legislated requirements, which means less monitoring; reporting; and paper work and legal fees. However, the fact that not all producers are participating in the program can create an economic disadvantage for those that are. Companies that do not bear the cost of the program can sell a cheaper product, and may also have their product collected and recycled with the other paying materials.

What will this mean for farmers?

A well-designed EPR program for agricultural waste can benefit farmers in several ways. First, by shifting the financial responsibility of product or packaging waste to producers, farmers can eliminate disposal problems they currently have with various wastes. Second, farmers are required to participate in the program, which at a minimum means preparing materials for transport, or may mean driving a load of material to a collection site. Finally, farmers can have confidence that these waste products are being handled in an environmentally sound manner. Farmer *may* also face additional fees or product price increases *if* costs are directly transferred to consumers.

What will this mean for producers?

Currently, the Manitoba Packaging and Printed Paper (PPP) stewardship legislation 195/2008 requires that brandowners or first importers of cardboard, boxboard and laminate packaging pay weight-based fees to fund the program. Funds are paid directly to municipalities and used to finance 80% of municipal recycling.

Producers of other farm products like bags; twine and film wrap may be required to either join existing collectives of industries that currently manage other stewards' obligations, or they can form their own collective with a focus on the management of agricultural-only wastes and/or packaging. Producers will likely be required to provide a fee for materials sold into the province based on the costs of the program, and required to work with farmers to come up with innovative ideas for recovering the myriad of agricultural wastes being discussed.

In Summary

The intention of EPR programs is to improve environmental and financial performance of waste diversion programs. The unfortunate reality is that EPR programs sometimes encounter difficulties. Some issues that have been noted include concerns about programs not meeting targets or programs being too expensive. In other cases there are considerable concerns about who actually pays for the program.

Experience in Manitoba and throughout the rest of Canada has illustrated the importance of working closely with the manufacturers, retailers and generators of specific wastes (farmers) before creating new waste diversion policies or regulations. It is widely acknowledged that individual businesses or groups of businesses can best design programs specifically geared to their needs. Programs should ensure full participation of all stewards while supporting competition to keep operations efficient.

Manitoba farmers and product stewards can play a vital role in the direction that an EPR program takes in this province. Now is the time to learn what these programs involve and do the ground-work necessary to help guide decision-makers on how best to develop programs that make sense for the province.

Appendix D – Manitoba *Packaging and Printed Paper (PPP) Stewardship Regulation*

THE WASTE REDUCTION AND PREVENTION ACT
(C.C.S.M. c. W40)

Packaging and Printed Paper Stewardship Regulation

LOI SUR LA RÉDUCTION DU VOLUME ET DE LA PRODUCTION DES DÉCHETS
(c. W40 de la C.P.L.M.)

Règlement sur la gestion des emballages et des imprimés

Regulation 195/2008
Registered December 22, 2008

Règlement 195/2008
Date d'enregistrement : le 22 décembre 2008

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INTERPRETATION

Definitions and interpretation

1(1) The following definitions apply in this regulation.

"**Act**" means *The Waste Reduction and Prevention Act*. (« *Loi* »)

"**business**" includes farming. (« affaires »)

"**designated material**" means a material designated in section 2. (« matériaux désignés »)

"**goods**" means products or materials that are ready to be supplied for consumption. (« biens »)

"**operator**" means a person who operates a packaging and printed paper stewardship program approved by the minister in accordance with this regulation. (« administrateur »)

INTERPRÉTATION

Définitions et interprétation

1(1) Les définitions qui suivent s'appliquent au présent règlement.

« **activité prescrite** » Activité ou programme offert par :

a) le gouvernement du Manitoba, une municipalité ou un district d'administration locale, ou par une communauté ou une communauté constituée selon le sens que la *Loi sur les affaires du Nord* attribue à ces deux derniers termes;

b) une école, un collège, une université ou un autre établissement d'enseignement, y compris une activité ou un programme de nature éducative ou administrative ou ayant trait à la collecte de fonds ou aux relations publiques ou avec les anciens élèves;

"**packaging**" means any package or container, or any part of a package or container, that is comprised of glass, metal, paper or plastic, or any combination of any of those materials and includes, but is not limited to, service packaging. (« conditionnement »)

"**packaging and printed paper stewardship program**" means a waste reduction and prevention program for waste packaging and printed paper approved under section 6. (« programme de gestion des emballages et des imprimés »)

"**person**" includes a partnership. (« personne »)

"**pre-packaged goods**" means goods that are in the packaging in which they would ordinarily be supplied for consumption. (« biens préemballés »)

"**prescribed activity**" means

(a) an activity or program of the Government of Manitoba, or of a municipality or local government district, or of a community or incorporated community as defined in *The Northern Affairs Act*;

(b) an activity or program of a school, college, university or other educational institution, including, but not limited to, an educational, administrative, fund-raising, public-relations or alumni-relations activity or program;

(c) an activity or program of a church or other religious organization, including, but not limited to, a religious, administrative, fund-raising or public-relations activity or program; or

(d) an activity or program of a non-profit organization, including, but not limited to, an educational, administrative, fund-raising or public-relations activity or program. (« activité prescrite »)

c) une église ou un autre organisme religieux, y compris une activité ou un programme de nature religieuse ou administrative ou ayant trait à la collecte de fonds ou aux relations publiques;

d) un organisme à but non lucratif, y compris une activité ou un programme de nature éducative ou administrative ou ayant trait à la collecte de fonds ou aux relations publiques. ("prescribed activity")

« **administrateur** » Personne qui administre un programme de gestion des emballages et des imprimés que le ministre approuve conformément au présent règlement. ("operator")

« **affaires** » S'entend notamment de l'exploitation agricole. ("business")

« **biens** » Produits ou matériaux prêts à être fournis en vue de leur consommation. ("goods")

« **biens préemballés** » Biens qui se trouvent dans l'emballage dans lequel ils seraient normalement fournis en vue de leur consommation. ("pre-packaged goods")

« **conditionnement** » Emballage qui est rempli ou placé au point de vente afin de permettre ou de faciliter la livraison de biens par un détaillant, un débit de restauration ou un autre établissement du secteur des services. ("service packaging")

« **emballage** » Tout ou partie d'un emballage ou d'un contenant comportant du verre, du métal, du papier ou du plastique ou une combinaison de ces matériaux, y compris les conditionnements. ("packaging")

« **fourniture** » Sauf dans le cas d'une fourniture effectuée dans le seul but de créer une sûreté au sens de la *Loi sur les sûretés relatives aux biens personnels* ou de la *Loi sur les banques* (Canada), s'entend du transfert d'un intérêt de propriété :

a) par vente, conditionnelle ou autre;

b) par échange;

"**printed paper**" means paper that is not packaging, but is printed with text or graphics as a medium for communicating information, and includes telephone directories, but does not include

(a) other types of bound reference books;

(b) bound literary books; or

(c) bound text books. (« imprimés »)

"**registry**" means the public registry established under section 17 of *The Environment Act*. (« registre »)

"**service packaging**" means packaging that is filled or applied at the point of sale to enable or facilitate the delivery of goods by a retail seller or a food service industry or other service industry outlet. (« conditionnement »)

"**steward of designated material**" means

(a) the first person who, in the course of business or a prescribed activity in Manitoba, supplies a designated material to another person; or

(b) a person who, in the course of business or a prescribed activity in Manitoba, uses a designated material obtained in a supply transaction outside of Manitoba. (« gestionnaire »)

"**supply**" means to transfer a property interest by

(a) sale, whether conditional or otherwise;

(b) exchange;

(c) barter;

(d) lease or rental, whether with an option to purchase or otherwise; or

(e) gift;

but does not include a supply that is effected solely to create a security interest within the meaning of *The Personal Property Security Act* or the *Bank Act* (Canada). (« fourniture »)

c) par troc;

d) par bail ou location, avec ou sans option d'achat ou autre;

e) par donation. ("supply")

« **gestionnaire** »

a) La première personne qui, dans le cadre de ses affaires au Manitoba ou d'une activité prescrite y exercée, fournit des matériaux désignés à une autre personne;

b) la personne qui, dans le cadre de ses affaires au Manitoba ou d'une activité prescrite y exercée, utilise des matériaux désignés obtenus au cours d'une opération de fourniture effectuée à l'extérieur de la province. ("steward of designated material")

« **imprimés** » Papiers qui ne constituent pas des emballages, mais sur lesquels se trouvent du texte ou des graphiques imprimés à des fins de communication d'information, y compris les annuaires téléphoniques. La présente définition vise les annuaires téléphoniques, mais exclut notamment :

a) les autres types d'ouvrages de référence reliés;

b) les œuvres littéraires reliées;

c) les livres de cours reliés. ("printed paper")

« ***Loi*** » La *Loi sur la réduction du volume et de la production des déchets*. ("Act")

« **matériaux désignés** » Matériaux désignés en application de l'article 2. ("designated material")

« **personne** » Sont assimilées aux personnes les sociétés en nom collectif. ("person")

« **programme de gestion des emballages et des imprimés** » Programme de réduction du volume et de la production de déchets provenant d'emballages et d'imprimés approuvé en vertu de l'article 6. ("packaging and printed paper stewardship program")

"**waste packaging and printed paper**" means packaging and printed paper that through use, storage, handling, defect, damage, expiry of shelf life or other similar circumstance can no longer be used for its original purpose. (« vieux emballages et imprimés »)

« **registre** » Le registre public établi en application de l'article 17 de la *Loi sur l'environnement*. ("registry")

« **vieux emballages et imprimés** » Emballages et imprimés qui ne peuvent plus remplir leur fonction originale notamment parce qu'ils ont été utilisés, entreposés ou manipulés, parce qu'ils sont défectueux ou endommagés ou que leur vie utile a pris fin. ("waste packaging and printed paper")

1(2) When the designated material is printed paper, a supply of the designated material by a person is a supply "for consumption" if it is a supply

(a) by the person for use by a final user in Manitoba and not for the purpose of its being supplied again; or

(b) to a second person followed by one or more supply transactions, any of which is a transaction in which the designated material is supplied for use by a final user in Manitoba and not for the purpose of being supplied again.

1(2) La fourniture de matériaux désignés qui sont des imprimés est faite « à des fins de consommation » s'ils sont fournis :

a) à un utilisateur final au Manitoba et non dans le but d'être fournis de nouveau;

b) à une autre personne et s'ils font ensuite l'objet d'une ou de plusieurs opérations de fourniture dans le cadre desquelles les matériaux désignés sont fournis à des fins d'utilisation par un utilisateur final au Manitoba et non dans le but d'être fournis de nouveau.

1(3) When the designated material is packaging of pre-packaged goods, a supply of the designated material by a person is a supply "for consumption" if the designated material is supplied containing a beverage or other pre-packaged good

(a) that is supplied by the person for use by a final user in Manitoba and not for the purpose of its being supplied again; or

(b) to a second person followed by one or more supply transactions, any of which is a transaction in which the beverage or other pre-packaged good is supplied for use by a final user in Manitoba and not for the purpose of being supplied again.

1(3) La fourniture de matériaux désignés qui sont des biens préemballés est faite « à des fins de consommation » s'ils contiennent une boisson ou un autre bien préemballé et s'ils sont fournis :

a) à un utilisateur final au Manitoba en vue de leur utilisation et non dans le but d'être fournis de nouveau;

b) à une autre personne et s'ils font ensuite l'objet d'une ou de plusieurs opérations de fourniture dans le cadre desquelles la boisson ou l'autre bien préemballé est fourni à des fins d'utilisation par un utilisateur final au Manitoba et non dans le but d'être fourni de nouveau.

1(4) When the designated material is service packaging, the designated material is supplied "for consumption" when

(a) a retail seller, or a food service industry or other service industry outlet, uses the designated material to package goods for supply at retail; or

1(4) La fourniture de matériaux désignés qui sont des conditionnements est faite « à des fins de consommation » lorsqu'un détaillant, un débit de restauration ou un autre établissement du secteur des services :

a) utilise les matériaux désignés pour emballer des biens en vue de leur fourniture au détail;

(b) a retail seller, or a food service industry or other service industry outlet, supplies the designated material to facilitate the removal

(i) of prepackaged goods by a final user from the place in Manitoba where the goods are supplied at retail, or

(ii) of goods, whether or not they are retail goods, in relation to which a service has been performed from the place where the service was performed.

1(5) For the purpose of clause (a) of the definition "steward of designated material" in subsection (1), a person who

(a) solicits orders, directly or through an agent, for the designated material from persons in Manitoba by advertising or other means;

(b) accepts orders for the designated material that originate in Manitoba; and

(c) causes the designated material to be delivered in Manitoba;

is deemed to be the first person who supplies designated material to another person in the course of business in Manitoba.

1(6) This regulation does not apply to a container as defined in the *Used Oil, Oil Filters and Containers Stewardship Regulation*.

b) fournit les matériaux désignés pour faciliter l'enlèvement :

(i) de biens préemballés par un utilisateur final au Manitoba, à l'endroit où ils sont fournis au détail,

(ii) de biens, vendus au détail ou non, à l'égard desquels un service a été offert, à l'endroit de l'offre du service en question.

1(5) Pour l'application de l'alinéa a) de la définition de « gestionnaire » figurant au paragraphe (1), est réputée être la première personne qui, dans le cadre de ses affaires au Manitoba, fournit des matériaux désignés la personne qui, à la fois :

a) sollicite, directement ou par l'entremise d'un mandataire, auprès de personnes qui se trouvent dans la province, des commandes à l'égard de ces matériaux au moyen de publicités ou autrement;

b) accepte à l'égard de ces matériaux des commandes provenant de la province;

c) fait en sorte que ces matériaux soient livrés dans la province.

1(6) Le présent règlement ne s'applique pas à un contenant au sens du *Règlement sur la gestion de l'huile usée et des filtres à huile et contenants usagés*.

DESIGNATION OF MATERIAL

Designation of material

2 The following are designated as designated material for the purposes of the Act:

(a) packaging, but not including containers for which a refundable deposit is payable when the goods are supplied at retail and the packaging of those containers;

(b) printed paper.

DÉSIGNATION DES MATÉRIAUX

Désignation des matériaux

2 Pour l'application de la *Loi*, sont des matériaux désignés :

a) les emballages, à l'exclusion des contenants pour lesquels une consigne remboursable est payable au moment de la fourniture de biens au détail et de leur emballage;

b) les imprimés.

PACKAGING AND PRINTED PAPER STEWARDSHIP PROGRAM

PROGRAMME DE GESTION DES EMBALLAGES ET DES IMPRIMÉS

Prohibitions

3(1) No person shall supply designated material for consumption unless

(a) the steward of the designated material operates or subscribes to a packaging and printed paper stewardship program; or

(b) the person operates or subscribes to a packaging and printed paper stewardship program.

Interdictions

3(1) Il est interdit de fournir des matériaux désignés à des fins de consommation à moins que le gestionnaire ou le fournisseur n'administre un programme de gestion des emballages et des imprimés ou ne participe à un tel programme.

3(2) No person shall in the course of business use in Manitoba designated material obtained in a supply transaction outside of Manitoba unless the person operates or subscribes to a packaging and printed paper stewardship program.

3(2) Il est interdit d'utiliser, dans le cadre de ses affaires au Manitoba, des matériaux désignés obtenus à la suite d'une opération de fourniture à l'extérieur de la province, à moins d'être l'administrateur d'un programme de gestion des emballages et des imprimés ou de participer à un tel programme.

3(3) No person shall supply designated material for consumption in a retail sale in Manitoba unless the person makes available to the consumer point of sale information under a packaging and printed paper stewardship program.

3(3) Il est interdit de fournir des matériaux désignés à des fins de consommation dans le cadre d'une vente au détail au Manitoba à moins de mettre à la disposition du consommateur, au point de vente, des renseignements en vertu d'un programme de gestion des emballages et des imprimés.

Requirements for a packaging and printed paper stewardship program

4(1) A packaging and printed paper stewardship program must be

(a) consistent with the principles set out in subsection 1(2) of the Act;

(b) consistent with any written guidelines established by the minister respecting such programs; and

(c) open to any steward of designated material who wishes to subscribe to the program in accordance with the plan for the program approved by the minister under this regulation.

Exigences du programme

4(1) Le programme de gestion des emballages et des imprimés :

a) est compatible avec les principes énoncés au paragraphe 1(2) de la *Loi*;

b) est compatible avec les lignes directrices que le ministre établit par écrit pour ce genre de programme;

c) est accessible aux gestionnaires qui désirent y participer conformément au plan du programme que le ministre a approuvé en vertu du présent règlement.

4(2) A plan for a packaging and printed paper stewardship program must include provision for

(a) the establishment and administration of a waste reduction and prevention program for packaging and printed paper with waste reduction and prevention targets as set out in the plan;

(b) the appropriate management of waste packaging and printed paper in accordance with any written guidelines established by the minister;

(c) a province-wide, convenient collection system for waste packaging and printed paper without user fees at the point of collection;

(d) a system for the payment of expenditures incurred in the collection, transportation, storage, processing and disposal of waste packaging and printed paper in connection with the waste reduction and prevention program;

(e) the orderly collection of revenues from subscribers to the program in balance with expenditures for the program;

(f) the establishment and administration of education programs for the purpose of the waste reduction and prevention program;

(g) the establishment and administration of a point of sale information program for the purpose of the waste reduction and prevention program;

(h) the payment of salaries and other costs of government for the administration and enforcement of this regulation and of the Act as it relates to packaging and printed paper; and

(i) ongoing consultations about the stewardship program with persons who the operator considers the stewardship program may affect, including members of the public, in accordance with any guidelines respecting consultation that the minister may establish.

4(2) Le plan d'un programme de gestion des emballages et des imprimés prévoit :

a) la création et la gestion d'un programme de réduction du volume et de la production des déchets provenant des emballages et des imprimés ainsi que les objectifs visés;

b) la bonne gestion des vieux emballages et imprimés conformément aux lignes directrices écrites que le ministre a établies, le cas échéant;

c) un système efficace de collecte des vieux emballages et imprimés à l'échelle de la province qui ne comporte pas de frais d'utilisation;

d) un système de paiement des dépenses engagées pour la collecte, le transport, l'entreposage, la transformation et l'élimination des vieux emballages et imprimés dans le cadre du programme de réduction du volume et de la production des déchets;

e) une collecte efficace des revenus auprès des participants au programme qui compensent pour les dépenses engagées dans le cadre de celui-ci;

f) la création et la gestion de projets de sensibilisation dans le cadre du programme de réduction du volume et de la production des déchets;

g) la création et la gestion d'un projet d'information, au point de vente, dans le cadre du programme de réduction du volume et de la production des déchets;

h) le versement des frais que le gouvernement engage, y compris les salaires, dans le cadre de l'application de la *Loi* et du présent règlement à l'égard des emballages et des imprimés;

i) des consultations continues portant sur le programme de gestion des emballages et des imprimés avec les personnes qui, selon l'administrateur, pourraient être touchées par celui-ci, notamment le grand public, en conformité avec les lignes directrices en matière de consultation que le ministre peut établir.

4(3) A plan for a packaging and printed paper stewardship program may include

(a) provision for the establishment and administration of research and development activities related to the management of packaging and printed paper;

(b) provision for training and educational activities related to the management of packaging and printed paper;

(c) provision for activities related to pollution prevention and waste reduction; and

(d) any other activities that the minister may approve.

4(3) Le plan d'un programme de gestion des emballages et des imprimés peut prévoir :

a) la création et la gestion d'activités de recherche et de développement en matière de gestion des emballages et des imprimés;

b) des activités de formation et de sensibilisation en matière de gestion des emballages et des imprimés;

c) des activités en matière de prévention de la pollution et de la réduction des déchets;

d) toute autre activité qu'approuve le ministre.

4(4) The fiscal year of a packaging and printed paper stewardship program must be the calendar year.

4(4) L'exercice des programmes de gestion des emballages et des imprimés correspond à l'année civile.

Application for approval

5(1) A person who intends to operate a packaging and printed paper stewardship program must submit a plan for the program and apply to the minister for approval of the plan. Before submitting the plan and application, the person must comply with any guidelines that the minister has established respecting consultation about stewardship programs before the application stage.

Demandes d'approbation

5(1) Les personnes qui ont l'intention d'administrer un programme de gestion des emballages et des imprimés soumettent un plan pour le programme et demandent au ministre de l'approuver. Avant de soumettre le plan et la demande, elles se conforment aux lignes directrices établies par le ministre relativement à la consultation portant sur les programmes de gestion et devant être tenue avant la présentation d'une demande.

5(2) An application for approval of a plan for a packaging and printed paper stewardship program or renewal of an approval must

(a) be in the form and contain the information required by the minister; and

(b) include

(i) a business plan for the implementation of the applicant's responsibilities under the Act and this regulation covering the period for which the approval is being sought, and

5(2) Toute demande d'approbation du plan d'un programme de gestion des emballages et des imprimés ou de renouvellement d'approbation :

a) est présentée en la forme et contient les renseignements qu'exige le ministre;

b) comprend :

(i) un plan opérationnel précisant comment l'auteur de la demande s'acquittera des obligations que lui confèrent la *Loi* et le présent règlement pour la période visée par l'approbation,

(ii) a description of the consultations about the proposed stewardship program carried out by the applicant before applying and a summary of the results of the consultations.

(ii) des précisions ayant trait aux consultations sur le programme de gestion des emballages et des imprimés proposé qu'a tenues l'auteur de la demande avant la présentation de sa demande et un résumé des résultats des consultations.

5(3) After receiving a plan for a packaging and printed paper stewardship program, or for the renewal of an approval, the minister must file it in the registry. The minister is to

(a) receive comments on the plan for 28 days from the date it is filed in the registry; and

(b) consider the comments before making a decision on whether or not to approve the plan under subsections 6(1) and (2).

5(3) Le ministre dépose au registre les plans des programmes de gestion des emballages et des imprimés et des demandes de renouvellement d'approbation qu'il reçoit et :

a) accepte les observations à propos des plans pendant les 28 jours suivant leur dépôt au registre;

b) étudie les observations avant de décider s'il approuve ou non les plans en vertu des paragraphes 6(1) et (2).

5(4) An application for renewal of an approval must be received by the minister no later than 60 days before the expiry of the existing period of approval.

5(4) Le ministre doit recevoir les demandes de renouvellement d'approbation au plus tard le soixantième jour avant l'expiration de la période d'approbation.

Applicant must meet requirements for approval

6(1) An applicant must meet the requirements of the Act, this regulation and any written guidelines established by the minister before being entitled to an approval of a packaging and printed paper stewardship program plan or renewal of an approval.

Exigences

6(1) L'auteur d'une demande doit se conformer à la *Loi*, au présent règlement et aux lignes directrices écrites que le ministre établit, le cas échéant, avant que son plan de programme de gestion des emballages et des imprimés ou sa demande de renouvellement d'approbation ne puisse être approuvé.

6(2) The minister may grant an approval subject to conditions.

6(2) Le ministre peut accorder une approbation conditionnelle.

6(3) The minister may grant an approval on an interim basis subject to conditions to be complied with by the applicant pending confirmation or refusal of the approval.

6(3) Le ministre peut accorder une approbation provisoire sous réserve des conditions que l'auteur de la demande est tenu de respecter en attendant la confirmation ou le refus de l'approbation.

Issuance of approval

7(1) In this section "**approval**" includes an interim approval granted under subsection 6(3).

Approbations

7(1) Pour l'application du présent article, sont assimilées aux approbations les approbations provisoires accordées en vertu du paragraphe 6(3).

7(2) The minister must issue a letter of approval to an applicant who is entitled to an approval of a packaging and printed paper stewardship program plan or a renewal of approval.

7(2) Le ministre délivre une lettre d'approbation à l'auteur d'une demande qui a droit à une approbation de son plan de programme de gestion des emballages et des imprimés ou à son renouvellement.

7(3) A letter of approval must set out any conditions imposed by the minister.

7(4) An approval expires on the date stated in the letter of approval.

7(5) An approval is not transferable.

Minister may impose new or additional conditions

8 The minister may impose new or additional conditions on an approval granted under section 6.

Procedure for refusal of approval or renewal

9(1) When the minister proposes to refuse to grant or renew an approval of a packaging and printed paper stewardship program plan, the minister must serve a notice of the proposal and a statement of the reasons for it on the applicant.

9(2) A notice under subsection (1) must inform the applicant that he or she may, within 10 days after the notice is served, make representations in writing about the proposal.

9(3) If the applicant does not respond within the time stated in the notice, the minister may carry out the proposal stated in the notice.

9(4) If the applicant responds within the time stated in the notice, the minister must consider the representations by the applicant before

(a) carrying out the proposal; or

(b) granting the approval or renewal.

Continuance when renewal pending

10 When an applicant applies for renewal of the approval of his or her program plan within the time limit prescribed in subsection 5(4), the approval is deemed to continue

(a) until the renewal is granted; or

(b) if the applicant is served with a notice under subsection 9(1), until the minister carries out his or her proposal or issues the renewal.

7(3) La lettre d'approbation précise les conditions que le ministre impose, le cas échéant.

7(4) L'approbation expire à la date indiquée dans la lettre d'approbation.

7(5) Les approbations sont incessibles.

Conditions

8 Le ministre peut imposer des conditions nouvelles ou supplémentaires à l'égard des approbations accordées en vertu de l'article 6.

Refus d'approbation ou de renouvellement

9(1) S'il décide de refuser une approbation ou un renouvellement d'approbation pour le plan d'un programme de gestion des emballages et des imprimés, le ministre signifie à l'auteur de la demande un avis en ce sens qui précise les motifs de sa décision.

9(2) L'avis mentionné au paragraphe (1) précise que l'auteur de la demande peut, dans les 10 jours qui suivent sa signification, présenter des observations écrites à l'égard de la décision.

9(3) Le ministre peut donner suite à sa décision si l'auteur de la demande ne présente pas d'observations écrites dans le délai prévu dans l'avis.

9(4) Si l'auteur de la demande présente des observations écrites dans le délai prévu dans l'avis, le ministre les étudie avant :

a) de donner suite à sa décision;

b) d'accorder l'approbation ou le renouvellement de l'approbation.

Prorogation

10 Lorsqu'une personne présente une demande de renouvellement d'approbation du plan d'un programme dans le délai prévu au paragraphe 5(4), l'approbation est réputée prorogée :

a) jusqu'à ce que le renouvellement soit accordé;

b) si l'auteur de la demande reçoit signification de l'avis mentionné au paragraphe 9(1), jusqu'à ce que le ministre donne suite à sa décision ou accorde le renouvellement.

Suspension or cancellation of approval

11(1) The minister may suspend or cancel the approval of a plan for a packaging and printed paper stewardship program where the operator is in breach of any provision of the Act or this regulation.

11(2) Where the approval of a plan for a packaging and printed paper stewardship program is suspended under subsection (1), the operator must not operate the program until he or she satisfies any requirements for reinstatement imposed by the minister.

11(3) When the minister proposes to cancel or suspend the approval of a packaging and printed paper stewardship program plan, the minister must serve a notice of the proposal and a statement of the reasons for it on the operator and subsections 9(2) to (4) apply to the notice and the proposal with necessary modifications.

Cancellation in certain circumstances

12 Despite anything in this regulation, the minister may cancel the approval of an operator who

(a) ceases to operate a program; or

(b) applies to surrender his or her approval.

Amendment of plan

13(1) An operator may apply for approval of an amendment to a packaging and printed paper stewardship program plan subsequent to the approval of the plan by the minister and must

(a) file the amended program plan with the minister without delay for the minister's approval; and

(b) provide the minister with such information as he or she may require about the amendment and its effect on the program plan.

13(2) An operator must not act on any amendment to a program plan until the minister has notified the operator in writing that the amendment has been approved.

Suspension ou annulation de l'approbation

11(1) Le ministre peut suspendre ou annuler l'approbation du plan d'un programme de gestion des emballages et des imprimés d'un administrateur qui contrevient à la *Loi* ou au présent règlement.

11(2) L'administrateur ne peut offrir un programme de gestion des emballages et des imprimés dont l'approbation du plan fait l'objet d'une suspension en vertu du paragraphe (1) tant qu'il ne remplit pas les exigences de rétablissement qu'impose le ministre.

11(3) S'il décide d'annuler ou de suspendre l'approbation du plan d'un programme de gestion des emballages et des imprimés, le ministre signifie à l'administrateur un avis en ce sens qui précise les motifs de sa décision; les paragraphes 9(2) à (4) s'appliquent alors à l'avis et à la décision avec les adaptations nécessaires.

Annulation

12 Malgré les autres dispositions du présent règlement, le ministre peut annuler l'approbation accordée à l'administrateur :

a) qui cesse d'offrir un programme;

b) qui demande de renoncer à son approbation.

Modification du plan

13(1) Un administrateur peut demander l'approbation d'une modification du plan d'un programme de gestion des emballages et des imprimés après que le ministre a approuvé le plan :

a) en déposant aussitôt que possible auprès du ministre le plan modifié afin qu'il l'approuve;

b) en fournissant au ministre les renseignements qu'il peut exiger au sujet de la modification et de ses répercussions sur le plan.

13(2) L'administrateur ne peut mettre en œuvre les modifications au plan tant que le ministre ne l'a pas avisé par écrit qu'elles ont été approuvées.

13(3) After receiving an amended program plan, the minister must file it in the registry. The minister is to

(a) receive comments on the amended program plan for 28 days from the date it is filed in the registry; and

(b) consider the comments before making a decision on whether or not to approve the amended program plan under subsection (4).

13(4) The minister may approve the amendment or, subject to subsection (5), may refuse to approve the amendment.

13(5) When the minister proposes to refuse to approve an amendment, he or she must serve a notice of the proposal on the operator and subsections 9(2) to (4) apply to the notice and the proposal with necessary modifications.

Implementation and operation of plan
14 An operator must ensure that the packaging and printed paper stewardship program plan, as approved under section 6 or amended under section 8, or approved as amended under section 13, is implemented and operated substantially in accordance with its intent, subject to any conditions imposed by the minister.

Providing information
15 An operator must provide any information about the packaging and printed paper stewardship program requested by the minister.

REPORTS AND CONFIDENTIALITY

Annual report
16(1) Within 90 days after the end of the fiscal year, an operator must provide to the minister an annual report summarizing the program activities of the operator in the fiscal year and containing audited financial statements covering the program for the fiscal year.

13(3) Dès qu'il reçoit un plan de programme modifié, le ministre le dépose au registre et :

a) accepte les observations à propos du plan pendant les 28 jours suivant son dépôt;

b) étudie les observations avant de décider s'il approuve ou non le plan de programme modifié en vertu du paragraphe (4).

13(4) Le ministre peut approuver les modifications ou, sous réserve du paragraphe (5), refuser de les approuver.

13(5) S'il décide de refuser l'approbation d'une modification, le ministre signifie à l'administrateur un avis en ce sens. Les paragraphes 9(2) à (4) s'appliquent alors, avec les adaptations nécessaires, à l'avis et à la décision.

Mise en application du plan
14 L'administrateur veille à ce que le plan de programme de gestion des emballages et des imprimés approuvé en vertu de l'article 6, modifié en vertu de l'article 8 ou modifié et approuvé en vertu de l'article 13 soit essentiellement mis en application et administré conformément à son objet, sous réserve des conditions qu'impose le ministre, le cas échéant.

Communication de renseignements
15 L'administrateur communique les renseignements que demande le ministre au sujet du programme de gestion des emballages et des imprimés.

RAPPORTS ET CONFIDENTIALITÉ

Rapport annuel
16(1) Au plus tard le quatre-vingt-dixième jour suivant la fin de l'exercice, les administrateurs fournissent au ministre un rapport annuel résumant les activités de leur programme au cours de l'exercice et contenant les états financiers vérifiés du programme pour cette période.

16(2) Without limiting the generality of subsection (1), the annual report must include

(a) particulars of the financial contributions to the stewardship program by, and the stewardship costs attributable to, each product group of designated material covered by the program;

(b) a description of the consultations about the stewardship program carried out by the operator during the fiscal year and a summary of the results of the consultations; and

(c) any information about program performance recommended by the Auditor General for programs of the same nature as the stewardship program.

Information to be confidential

17(1) Except as provided in subsection (2), information given to the minister under section 15 or in any document upon which a report provided under section 16 is based is confidential to the extent that any information in the document would be reasonably expected to identify the volume of sales of any designated material or type of designated material, or the market share of any designated material or type of designated material, of any steward of designated material. No person who obtains the document shall knowingly disclose, or permit any person to disclose that information, except with the consent of the person who provided the report or document.

17(2) Information given to the minister under section 15 or a report provided under section 16 or any document upon which the report is based may be disclosed

(a) for the purpose of the administration or enforcement of the Act or this regulation or legal proceedings related to that enforcement;

(b) when required by law; or

(c) when the information in the report or document is publicly available.

16(2) Sans que soit limitée la portée générale du paragraphe (1), le rapport annuel comprend :

a) des détails sur l'apport financier au programme de gestion des emballages et des imprimés attribuable à chaque groupe de produits faisant partie des matériaux désignés ainsi que sur les frais de gestion liés à chacun de ces groupes;

b) des précisions ayant trait aux consultations sur le programme tenues par l'administrateur pendant l'exercice et un résumé des résultats des consultations;

c) des renseignements au sujet de l'efficacité du programme recommandés par le vérificateur général dans le cadre des programmes de même nature.

Confidentialité

17(1) Sauf dans les cas prévus au paragraphe (2), les renseignements fournis au ministre conformément à l'article 15 ou contenus dans un document sur lequel est fondé le rapport prévu à l'article 16 sont confidentiels dans la mesure où ils sont de nature à révéler le volume de vente d'un matériau désigné ou d'un type de matériau désigné ou la part du marché que détient un gestionnaire pour un matériau désigné ou un type de matériau désigné. Il est interdit à quiconque obtient le document de divulguer sciemment ces renseignements ou de permettre qu'ils soient divulgués sans le consentement de la personne qui a fourni le rapport ou le document.

17(2) Il est permis de divulguer les renseignements communiqués au ministre en vertu de l'article 15, le rapport mentionné à l'article 16 et les documents sur lesquels est fondé ce rapport :

a) pour l'application de la *Loi* ou du présent règlement ou aux fins d'une poursuite judiciaire liée à cette mise en application;

b) lorsque la loi l'exige;

c) lorsque le public a accès aux renseignements contenus dans le rapport ou les documents.

Availability of annual report
18(1) The minister must

(a) table a copy of the annual report in the Assembly within 15 days after receiving it if the Assembly is sitting or, if it is not, within 15 days after the next sitting begins; and

(b) file a copy of any annual report received by him or her under section 16 in the registry.

18(2) After providing the minister with an annual report under section 16, the operator of packaging and printed paper stewardship program must make a copy of the report available without cost to any person on request.

Accès au rapport annuel
18(1) Le ministre :

a) dépose à l'Assemblée législative une copie du rapport annuel dans les 15 premiers jours de séance de celle-ci suivant sa réception;

b) dépose au registre une copie de tout rapport annuel qu'il reçoit en application de l'article 16.

18(2) Après avoir fourni un rapport annuel au ministre en application de l'article 16, l'administrateur d'un programme de gestion des emballages et des imprimés fournit gratuitement une copie du rapport aux personnes qui en font la demande.

GENERAL PROVISIONS

DISPOSITIONS GÉNÉRALES

Minister may establish guidelines
19 The minister may establish written guidelines respecting

(a) the requirements for a packaging and printed paper stewardship program and the operation of such a program, including waste reduction and prevention targets that the program should be designed and operated to meet;

(b) the management of waste packaging and printed paper;

(c) the criteria for program performance evaluation; or

(d) any other matter provided for under this regulation.

Lignes directrices
19 Le ministre peut établir par écrit des lignes directrices concernant :

a) les exigences à l'égard des programmes de gestion des emballages et des imprimés et de leur administration, y compris les objectifs que ces programmes devraient viser;

b) la gestion des vieux emballages et imprimés;

c) les critères d'évaluation de l'efficacité du programme;

d) toute autre question prévue au présent règlement.

Service of notices
20(1) A notice that is required to be served by the minister must be served on a person in accordance with subsection (2), and

(a) if the person is an individual, on the individual;

(b) if the person is a corporation, on a director or officer of the corporation; or

Signification des avis
20(1) Lorsqu'il est tenu de signifier des avis, le ministre les signifie conformément au paragraphe (2), selon le cas :

a) si le destinataire est un particulier, directement à celui-ci;

b) si le destinataire est une personne morale, à un de ses administrateurs ou dirigeants;

(c) if the person is a partnership, on a partner who is an individual or a corporation, in the manner set out in clause (a) or (b), as the circumstances require.

20(2) A notice may be served on a person or on a director or officer of a corporation

(a) by personally giving a copy to the person, director or officer;

(b) by sending a copy to his or her address last known to the minister by any method, including registered mail, certified mail or prepaid courier, if there is a record of delivery by the party who delivered the copy; or

(c) by telephone transmission of a facsimile of the notice or by other electronic transmission to the person, director or officer, if there is a record

(i) of the telephone number to which the transmission was sent,

(ii) of the date on which the transmission was sent, and

(iii) that the transmission included the full text of the notice.

20(3) A notice sent by mail is deemed to be received by the intended recipient on the earlier of

(a) the day the intended recipient actually receives it; and

(b) the fifth business day after the day it is mailed.

20(4) A notice sent by a method referred to in clause (2)(c) is deemed to be received by the intended recipient on the earlier of

(a) the day the intended recipient actually receives it; and

(b) the first business day after the day it is sent.

c) si le destinataire est une société en nom collectif, à un associé qui est un particulier ou une personne morale, conformément à l'alinéa a) ou b).

20(2) Les avis peuvent être signifiés soit à une personne, soit à un administrateur ou à un dirigeant d'une personne morale, selon le cas :

a) à personne, par remise d'une copie à la personne, à l'administrateur ou au dirigeant;

b) par envoi d'une copie, par n'importe quel moyen, à la dernière adresse du destinataire connue du ministre, notamment par courrier recommandé ou certifié ou par messager port payé, si la personne qui les signifie a consigné leur envoi;

c) par télécopie ou sous une autre forme de transmission électronique à la personne, à l'administrateur ou au dirigeant s'il y a un document indiquant :

(i) les numéros de téléphone où les avis ont été envoyés,

(ii) les dates auxquelles les transmissions ont été effectuées,

(iii) que le texte intégral des avis a été transmis.

20(3) Les avis envoyés par courrier sont réputés reçus par le destinataire prévu :

a) à la date où il les reçoit;

b) le cinquième jour ouvrable qui suit leur mise à la poste, si cette date est antérieure.

20(4) Les avis envoyés par un moyen mentionné à l'alinéa (2)c) sont réputés reçus par le destinataire prévu :

a) à la date où il les reçoit;

b) le premier jour ouvrable qui suit l'envoi, si cette date est antérieure.

COMING INTO FORCE

Coming into force

21(1) This regulation, except section 3, comes into force on the day it is registered under *The Regulations Act*.

21(2) Section 3 comes into force on the same day that section 27 of the *Multi-Material Stewardship (Interim Measures) Regulation*, Manitoba Regulation 39/95 is repealed.

ENTRÉE EN VIGUEUR

Entrée en vigueur

21(1) Le présent règlement, à l'exception de l'article 3, entre en vigueur à la date de son enregistrement sous le régime de la *Loi sur les textes réglementaires*.

21(2) L'article 3 entre en vigueur à la date d'abrogation de l'article 27 du *Règlement sur la gestion des matériaux multiples (mesures provisoires)*, *R.M.* 39/95.

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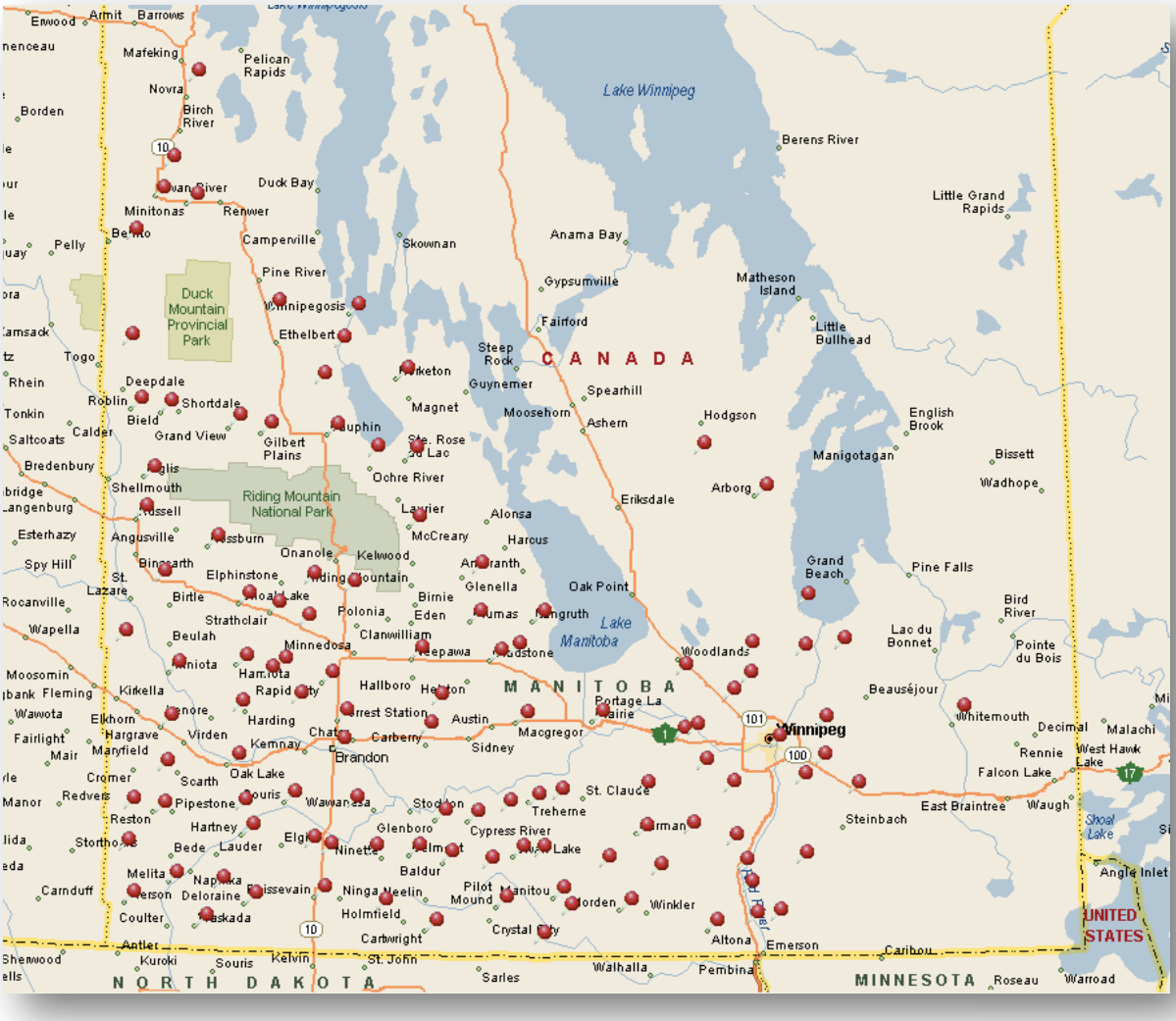
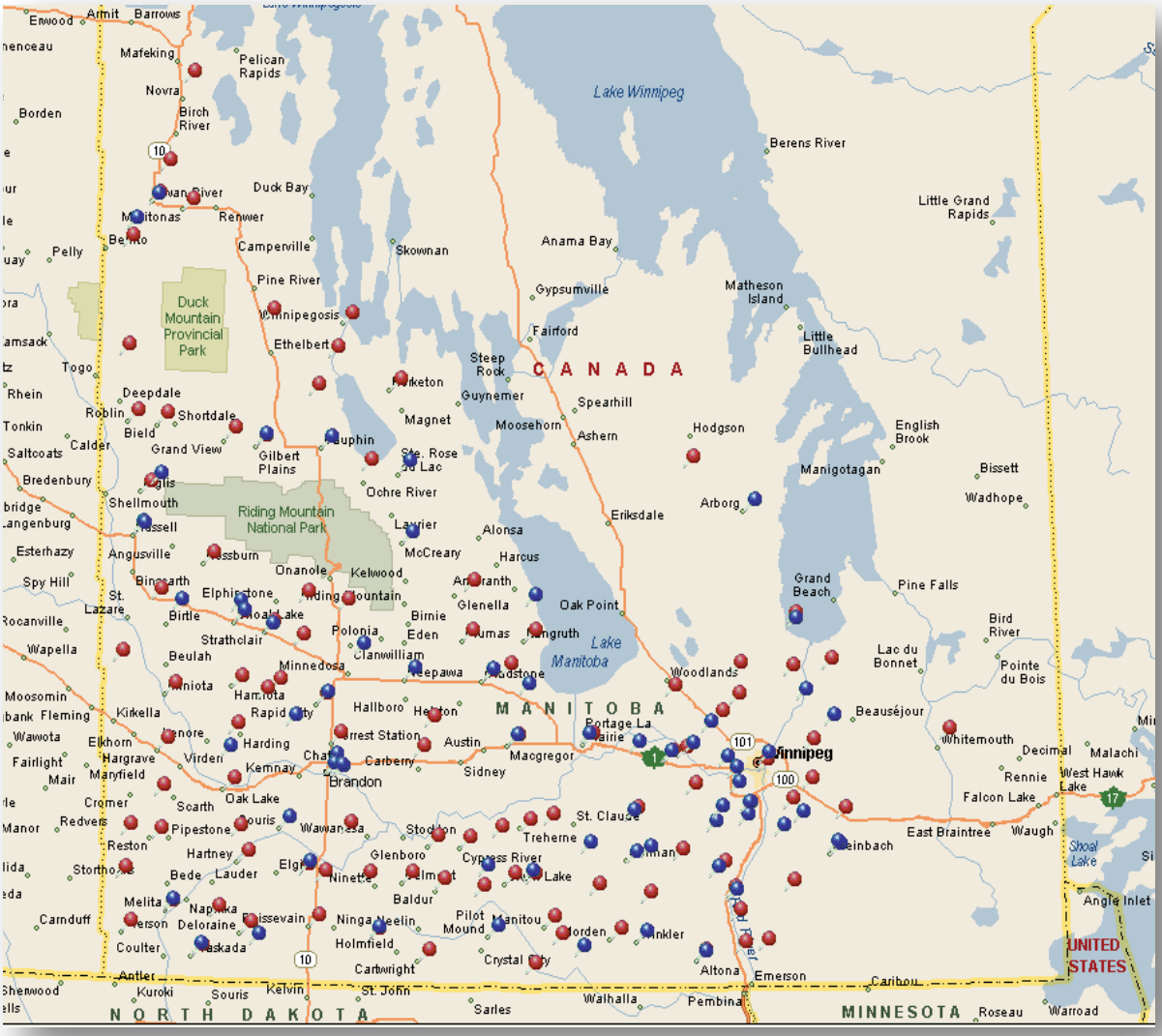
Appendix E – Manitoba Municipal Landfill Sites Used for Empty Pesticide Container Collection



Appendix F – Manitoba CAAR Member Agricultural Retail Sites

Ag Retailer Sites

Appendix G – Mixed CAAR Member Agricultural Retail Sites and Municipal Landfill Sites



Municipal Sites

Ag Retailer Sites

Appendix H – March 10 2011 - Webinar PowerPoint Presentation