



Ag Plastics Recycling Pilot Final Report

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In partnership with:

**Green Manitoba
Portage and District Recycling**

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Executive Summary

Based on the results of an agricultural waste characterization study undertaken in March of 2011 in Manitoba, agricultural plastic wastes were identified as a major issue facing the agricultural industry. It is estimated that over 1,000 tonnes of plastic wastes are generated annually on Manitoban farms. Currently, no recycling options exist for these materials. Current disposal practices – such as on site burial, landfilling and burning – remain prevalent because of the lack of recycling options available to farmers.

CleanFARMS was granted funding by Green Manitoba to undertake a small scale pilot program to collect and recycle some of the materials identified in the waste study. Bale and silage wrap, twine, and grain bags were collected from farmers at three locations across the province during the spring and summer of 2013. Farmers were asked to keep the materials as clean and dry as possible and to return the material to the local collection site in the designated CleanFARMS bags that were distributed through the municipalities and local Federated Co-op locations free of charge. Collection sites were located at the Portage la Prairie, Neepawa and Pierson landfill sites.

A comprehensive communications plan was developed and executed, including paid media advertisements in the local news publications, indoor/outdoor signage, brochures, and news releases. CleanFARMS and the Moose Jaw River Watershed Stewards held an information session about the program in Pierson and demonstrated how to roll a grain bag.

A number of objectives for the pilot program were identified:

- Determine the ability of Regional Municipalities to participate in an ag plastics recycling program;
- Determine logistical requirements for farmers to use the program;
- Derive initial estimates of potential recovery rates for a large-scale program;
- Provide an opportunity to solicit farmer feedback for a program such as this;
- Assess issues associated with the collection and handling of these materials;
- Assess types of containers best suited for both interim storage at the collection sites and for ease of loading and transportation to processing/baling facilities.

Overall, the pilot program was very successful. After receiving valuable feedback from the collection sites it has been determined that a municipal collection at a landfill is favourable and convenient for farmers, and a suitable system for the municipalities. The collection locations have minimal space constraints and can provide a level of quality control and education to farmers that other collection locations cannot.

In total, approximately 1.8 tonnes of grain bags, 1.6 tonnes of twine and 1 tonne of bale wrap were collected across the province.

Feedback from farmers and the collection sites has indicated that the bag-based collection is more favourable for smaller-scale farm operations, but does not adequately suit the needs of large-scale operations. As well, contamination remains a serious issue. CleanFARMS will be considering all feedback moving forward in the development of future pilot and permanent programs.

Introduction

As part of Manitoba's Green Plan - "Tomorrow Now" – new targets for agricultural plastic wastes have been identified with a commitment to keeping these materials out of rural landfills.

In 2011, a waste characterization study was undertaken by CleanFARMS in partnership with Manitoba Conservation and Water Stewardship, the Manitoba Rural Adaption Council (MRAC), and Manitoba Agriculture, Food and Rural Initiatives (MAFRI) to determine the types and tonnages of agricultural plastic wastes generated on farms every year.

CleanFARMS submitted a proposal to Green Manitoba for funding to plan and implement a pilot program for the collection, transportation and processing of agricultural plastic wastes, such as grain bags, bale wrap and twine. CleanFARMS was awarded a grant of \$25,000 by Green Manitoba under the Waste Reduction and Recycling Support (WRARS) landfill levy fund.

Background

In March, 2011 the agricultural waste characterization study revealed that there are approximately 6,000 tonnes of agricultural plastic wastes generated on farms annually in Manitoba. These wastes are generated as a result of a variety of agricultural operations and are comprised of a number of different materials – namely film plastics, cardboard and boxboard and feed/seed bags. Of the total, the results of the study estimated the following amounts of waste film plastics:

Product	Estimated Volume (tonnes)
Grain Bags	272.2
Silage Film	246.3
Bale Wrap	160.2
Plastic Twine	268.5 to 362.5
Net Wrap	118.1 to 128.4
Greenhouse Film	13.5
Mulch Film	0.4

The study also included a representative survey of Manitoban farmers to determine current disposal habits for the waste plastics. The following table summarizes the percentage of waste plastics being disposed of by means of burning, on-farm burial or landfilling:

Material Type	Burn	On-farm Burial	Landfill	Total
Grain Bags	5%	0%	9%	14%
Bale/Silage Wrap	66%	0%	14%	80%
Ag Twine/Net Wrap	56%	2%	19%	86%

It remains unknown how the grain bags are being managed based on the results of the survey. The use of plastic products, such as grain bags, is increasing in Manitoba and the Prairies and farmers have expressed that there is a need for an effective program to manage these types of wastes.

Grain bags, bale and silage wrap, and plastic baler twine were selected for this pilot based on the results of the waste characterization study. The materials were selected based on annual volumes and recyclability.

Objectives

The film plastic and twine collection pilot was designed and implemented to fulfill the following objectives;

- Determine the ability of Regional Municipalities to participate in a program for the collection of used agricultural film and twine generated by farmers;
- Determine logistics required for farmers to bring used materials to municipal drop off locations;
- Derive initial estimates of potential recovery rates for a program to collect these materials in Manitoba;
- Provide an opportunity to have personal contact with Manitoba farmers and solicit their opinions and ideas for structuring a province-wide program;
- Assess issues associated with the collection and handling of these materials at Regional Municipal landfill sites;
- Assess types of containers best suited for both interim storage at the collection sites and for ease of loading and transportation to processing/baling facilities.

Methodology

CleanFARMS partnered with three municipalities across Manitoba to collect bale and silage wrap, grain bags, and twine. The regional landfills in the cities of Portage La Prairie, Neepawa, and Pierson were selected as collection locations for the pilot, where rate-paying residents are able to drop off recyclables free of charge. These sites were selected in order to maximize the geographic reach of the pilot across the province. CleanFARMS has also partnered with Portage and District Recycling Inc. (PDRI), and the Moosejaw River Watershed Stewards to manage the collection and consolidation of the materials.

Collection

The pilot officially launched on October 5, 2012 with the initial press release. The pilot was scheduled to run until August 30, 2013 to give farmers adequate time to prepare the materials on farm and return them to the local collection site.

A bag-based collection system was piloted for bale and silage wrap and twine. Collection bags were manufactured and printed at a local bag supplier. The bags were printed with the CleanFARMS logo in two different colours – clear bags for bale and silage wrap and yellow tint for twine. The two different bags were used to help encourage farmers to sort the materials by type as they prepare the wastes for

recycling. The bag-based model for this pilot project was adopted from a number of similar collection programs operating around the world.

CleanFARMS engaged the Federated Co-op stores in each town to help distribute bags and communications materials to farmers upon request. The collection sites were also equipped with bags to hand out to eligible participants. Farmers were instructed to keep the materials as clean and as dry as possible when preparing the wastes for recycling, keeping material types separate and shaking the materials to remove any excess debris. Once the bags are full, farmers were instructed to seal the bags and drop them off at the designated compounds at each collection depot.

Because grain bags are very large and can often exceed 250 feet in length, farmers were asked to return grain bags pre rolled and bound in bundles 48 inches or less in diameter. At the end of the pilot, a grain bag roller from Saskatchewan was used to roll grain bags in preparation for shipping.

PDRI maintained regular correspondence with each collection site on a regular basis about the program and arranged to transport the material as required. All material was picked up and transported to the PDRI facility in Portage La Prairie and baled at the end of the pilot. The pilot officially concluded on August 30, 2013.

Communications

Effective communications were a necessary component in ensuring the success of the pilot. A number of key tools were used to communicate the program to farmers. Samples of the print communications tools can be found in Appendix A.

Postcard – A double-sided postcard was developed to communicate the collection site locations, preparation instructions, and the partnerships for the program. These postcards were distributed through the participating Federated Co-op locations and by the municipal collection locations.

Indoor/Outdoor Signage – Both indoor (11"x17") posters and outdoor coroplast signs were printed, indicating the collection locations and the instructions for preparing the materials. The coroplast signs were displayed at the collection sites near the drop-off location and the indoor posters were distributed to the local municipalities and retailers.

Print/Web Media – A print/web media campaign was executed in each of the local publications:

- Neepawa Banner – Weekly quarter page (4 weeks)
- Portage Harold – Weekly quarter page (4 weeks)
- Virden Empire – Weekly ½ page (4 weeks)
- Manitoba Cooperator (regional) – Weekly quarter page (4 weeks)
- Portage Online – Rotating square tile in news, ag and sports section (4 weeks)

News Release – A provincial news release was issued at the launch of the pilot project in October, 2012.

Grain Bag Rolling Demo – CleanFARMS staff and staff from the Moose Jaw River Watershed Stewards invited farmers and local/provincial government figures in the Regional Municipality of Edward to watch

and take part in a grain bag rolling demonstration following a set of presentations about the importance of recycling ag plastics. Following the demonstration, the RM of Edward purchased a grain bag roller in October 2013 with funding support from Green Manitoba. The roller will be available to farmers within the municipality and will help to better manage the collection, transportation and storage of waste grain bags in the future. Photos of the grain bag roller and demonstration can be found in Appendix C.

Material Collected

As the plastics were dropped off by farmers at the collection sites, staff on site performed a visual inspection of the material to determine if it was clean enough to keep. Site staff were instructed that material with >30% contamination (dirt, rocks, etc) should be kept separate from the other materials and landfilled. A small amount of material (mainly silage film) was diverted to landfill. The following chart outlines the approximate total of materials collected at each site:

	Portage La Prairie	Neepawa	Pierson	Total
Grain Bags	1,400 kgs	0	1,400 kgs	1,800 kgs
Twine	300 kgs	750 kgs	550 kgs	1,600 kgs
Bale Wrap	250 kgs	555 kgs	250 kgs	1,055 kgs

Based on the results of the waste characterization study, it can be estimated that approximately 0.5% of all available waste in the province were returned and recycled through the pilot program. This number does not include material that was landfilled due to excessive contamination.

Recycling

There are a number of viable end markets available for the grain bags, twine, and bale wrap. Because of the low volumes collected, the material from Manitoba was consolidated with the material collected through the Saskatchewan program and shipped to market from Moose Jaw, SK.

All of the twine is currently being recycled into new twine at Bridon Cordage in Minnesota. The grain bags and bale wrap from Manitoba will be baled in Regina and shipped overseas for recycling to be washed, pelletized and made into new film plastic products such as garbage bags.

There are several end markets for the LDPE film plastics (bale/silage wrap and grain bags) within Canada and the USA, but many of them require a guaranteed volume of material before recycling can be economically viable. Without a permanent, widespread approach to collecting these materials, the volumes will not be large enough to justify local recycling. CleanFARMS will continue to search for new local markets.

Results and Discussion

Overall, the pilot program was a success and produced some valuable “lessons learned” as we continue to explore larger scale programs in other parts of the country.

Using municipal waste management sites seemed to be quite effective for a number of reasons:

- 1) *Convenient for farmers* - Most farmers visit the landfill frequently and are familiar with the process at these sites.
- 2) *Adequate space* - The pilot collection sites all had enough room to facilitate storage and logistics (grain bag rolling, drop-off/loading, etc).
- 3) *Quality control for collected materials* - Most municipal landfill sites are supervised, providing opportunity for interaction with the farmer to provide instruction on how to prepare the material properly and what materials are accepted, as well as rejection of excessively dirty and non-program materials as necessary.

Feedback from the collection sites was generally positive, noting a few points of consideration:

- Contamination remains a serious issue. A moderate amount of collected material was landfilled due to high levels of contamination.
- A bag-based method works well for some farmers, but not for others. Farmers who generate large volumes of film and twine do not have the resources to load the bags by hand. Most used a front-end loader to stuff the bags, resulting in excessive contamination of mud and manure.
- Grain bags should be rolled properly on farm before being dropped off at the collection site to minimize double-handling and contamination, and to improve transportation and storage efficiencies on site.

Tammy Myers from the Moose Jaw River Watershed Stewards was hired to manage the rolling and collection of grain bags. She provided some feedback after visiting the collection sites:

- A better storage option is needed for twine. It was observed that the collection bags for twine began to disintegrate after being in the environment all summer and fall. This could be due to a combination of factors including UV degradation, temperature changes, wildlife intrusion and movement of the bags. The twine was re-bagged by site staff before shipping.

Adequate space is required for rolling grain bags at the collection sites. At the Pierson landfill the collection area was very small and cluttered with other materials, making it difficult to manipulate and roll the bags. In the future, a larger collection area, free of other debris should be used. The new grain bag roller purchased by Pierson will also help keep the collection area tidy, as bags can be rolled immediately on site, or rolled on farm before being transported to the site for storage.

It was also observed that the Portage La Prairie collection site was untidy and disorganized. Ensuring that the farmers properly bundle the material before dropping off, and stacking the materials neatly will reduce clutter and allow for a more efficient collection. This can be enforced by collection site staff.

- Vermin control is a very serious issue at some of the collection sites. Some of the grain bags were seen to have rat infestations or signs of rat activity. This is a serious issue for end markets and the presence of rats in recyclables has caused a Canadian recycler of ag plastics to shut down in the past.

A number of farmers from outside of the collection areas contacted CleanFARMS throughout the duration of the pilot program to make inquiries about how to recycle their used ag plastics. It was at the discretion of the collection sites to decide whether to collect materials from farmers outside the participating rural municipalities or not. This type of feedback underscores the need for a province-wide, permanent collection program.

Summary of Challenges:

1) Contamination remains a serious issue

Contamination is a problem for all recyclables and a certain amount of contamination is inevitable. For each material, there is a certain acceptable contamination limit as set by each individual processor based on the technology available. A general guide for contamination limits has been developed by CleanFARMS based on the processing options available:

Material	Maximum Contamination Limits
Film (bale/silage wrap)	15-20%
Grain Bags	5-10%
Twine	6-8%

Communication materials for the farmers help to emphasize the need to keep materials as clean as possible, and rejection of excessively dirty materials by the collection site operators help to ensure only clean recyclable materials are returned.

2) Bag-based collection does not adequately suit the needs of large-scale operators:

This is a product-specific issue generally encountered when dealing with bale and silage wrap. In other countries around the world there are generally two options, both with unique challenges. In Germany, a dumpster service is available to large-scale operators; however, non-program material and higher contamination levels are an issue. New Zealand offers larger plastic bags to large farms which are much heavier and require other equipment to move and load.

3) Vermin infestation at collection sites:

Vermin infestation is common among grain bag stock piles because of the availability of food and shelter for the rodents. Properly emptying the grain bags and rolling them tightly as soon as possible after use are the best ways to prevent rodent infestation.

4) Collection bags tearing under environmental conditions:

At two of the collection sites it was observed that the collection bags full of twine had degraded severely after being exposed to the elements over the course of a year. Tammy Myers noted that the degradation looked to be from prolonged UV exposure. Most of the twine was re-bagged before shipping.

The following table outlines the challenges and recommendations moving forward:

Challenge/Issue	Recommendations
Contamination is a serious issue	<ul style="list-style-type: none"> - Education for farmers and collection sites on why contamination is a problem, what constitutes contamination and how to minimize contamination levels
Bag-based method inadequate for large-scale operations	<ul style="list-style-type: none"> - Examine other options that will better facilitate the recovery and return of large volumes of material (i.e. larger bags, dumpster service, etc)
Vermin infestation at collection sites	<ul style="list-style-type: none"> - Properly baiting around collection area - Limit length of outdoor storage - Educate farmers to properly empty and prepare the bags for recycling
Collection bags tearing under environmental conditions	<ul style="list-style-type: none"> - Explore the use of a different type of collection bag (UV protected, thicker, etc) - Limit length of outdoor storage

Conclusion and Next Steps

The knowledge gained from this pilot program will serve to improve future pilots of this nature across the country and provide valuable insight into the development of successful permanent programs as stewardship regulations are developed implemented. Overall, the support for this initiative has been extremely strong on all levels - from farmers, retailers, local municipalities, and the provincial government.

CleanFARMS is committed to working with Green Manitoba and the Ministry of Conservation to establish a stewardship regulation in Manitoba for these materials. With industry funding, CleanFARMS will be able to establish a permanent program to service farmers across the province. Until a province-wide permanent program is established, CleanFARMS will continue to provide support and share the lessons learned from this project with other organizations across the country.

With funding from Green Manitoba, CleanFARMS is planning the expansion of the pilot program in 2014 to include more collection locations, ultimately servicing more farmers across the province. It is anticipated with the high-yield of grain in 2013 that a large number of grain bags will be available for recycling early in 2014.

Appendix A – Communications Materials

RETURN YOUR BALE WRAP, TWINE AND GRAIN BAGS

BALE WRAP AND TWINE MUST BE BAGGED. Pick up bags at participating Co-op Agri Centres and participating landfills. Grain bags must be rolled into bundles no bigger than 48" in diameter.

Program open to residents of the RM of Portage La Prairie, Evergreen Technologies partner municipalities and the RM of Edward.

Portage la Prairie Landfill PR 227, 6 miles east of Oakland
Evergreen Technologies Regional Landfill PR 466, 3.5 miles south of Hwy 16, West of Neepawa
RM of Edward Landfill Highway #256, one mile south of Highway #3

For more information call 877-622-4460 or visit: www.cleanfarms.ca

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Manitoba farmers can recycle BALE WRAP, TWINE and GRAIN BAGS

IT'S FREE AND EASY! For more information call 877 622 4460 or visit www.cleanfarms.ca

RETURN YOUR BALE WRAP, TWINE AND GRAIN BAGS

BALE WRAP AND TWINE MUST BE SEPARATED AND BAGGED. Grain bags must be rolled into bundles no bigger than 48" in diameter.

SHAKE

To remove debris

SEPARATE

TWINE
Bag it in yellow plastic bags.

BALE WRAP
Bag it in clear plastic bags. Bags are available at participating Co-op Agri Centres and participating landfills.

GRAIN BAGS
Roll into bundles no bigger than 48" in diameter.

RETURN

To your nearest waste transfer station.

Only clean, dry, and separated bale wrap, twine and rolled grain bags will be accepted. Bale wrap and twine must be bagged. NOT ACCEPTED: Unrolled grain bags, loose twine/wrap, feedbags.

For more information call 877-622-4460 or visit: www.cleanfarms.ca

RETURN – DON'T BURN. IT'S FREE AND EASY! This program is brought to you by:

Indoor/Outdoor Poster

SHAKE

To remove debris

SEPARATE IT

TWINE - Bag it in yellow plastic bags.
BALE WRAP - Bag it in clear plastic bags.
Bags are available at participating Federated Co-operatives Ltd. Neepawa-Gladstone, Portage La Prairie and Brandon.
GRAIN BAGS - Roll into bundles no bigger than 48" in diameter.

RETURN

To your nearest waste transfer station

Portage la Prairie Landfill
PR 227, 6 miles east of Oakland
Evergreen Technologies Regional Landfill
PR 466, 3.5 miles south of Hwy 16 (West of Neepawa)
RM of Edward Landfill
Highway #256, one mile south of Highway #3

Only clean, dry, and separated bale wrap, twine and rolled grain bags will be accepted. Bale wrap and twine must be bagged. NOT ACCEPTED: Unrolled grain bags, loose twine/wrap, feedbags, pesticide/ fertilizer containers

Printed on recycled paper

Double-sided Postcard

Appendix C – Collection Site Photos



Grain bag drop-off – Portage La Prairie



Rolled grain bags – Portage La Prairie



Broken twine bags - Pierson



Twine re-bagged - Pierson



Bagged twine and film - Neepawa



Baled grain bags ready for shipment – Regina, December. 2013



Tammy Myers (Moose Jaw River Watershed Stewards) speaking about the grain bag recycling program - February 2013



RM of Edward – Grain bag rolling demonstration - February 2013.