Disposal of Used Agricultural Plastic

Northern Ontario Pilot

Summary

The Northern Ontario Farm Innovation Alliance and the Northern Caucus of the Ontario Federation of Agriculture collaborated on a 3-year 'Disposal of Used Agricultural Plastic' pilot project that aimed to consolidate and collect used agricultural plastic and send it to an end-user for recovery and assess the viability and logistics of a collection program. The pilot ran from 2020 – 2022 and was funded in part by the Canadian Agricultural Partnership.

Upon the completion of the pilot, 25 compactors were in use across Northern Ontario and an additional 5 were in use across Eastern Ontario. 151 bales of agricultural plastic were collected and sent to Tri County Plastics in Brighton, where they will be recovered into composite plastic products such as patio stones. A pilot review was completed, with highlights summarized below.

During 2023, it is anticipated that another collection and shipment of bales will take place while a possible second iteration of the pilot is developed. Funding and available end-users will be key components in any upcoming iterations of a plastics collection program for Northern Ontario.

Compactors

The 25 compactors across Northern Ontario were used as follows:

- 11 purchased by farmers for use on their own farms,
- 1 purchased by the Nipissing West/East Sudbury Soil and Crop Improvement Association (Nipissing SCIA) and located at the Verner Co-op Régionale – loaned out to farmers for use on their farms,
- 2 plastic compactors purchased by the Algoma Federation of Agriculture – loaned out to local farmers for use,
- 1 purchased by Chisholm Township and located in their works yard – 8 farmers brought their bale wrap to the works yard for compaction,
- 2 purchased directly from U-Pac by 2 farmers,
- 4 farmers in Northern Ontario built their own compactors based on the U-Pac compactor design and
- 4 compactors sent to districts in Northwestern Ontario

Most farmers received their compactors 14 – 26 months prior to the end of the pilot, with an average time of 17 months. 91% of those surveyed rated the compactors as easy or very easy to use, but most

farmers reported that it either took two people to produce a bale or that two people made the process easier and faster than if done alone. Several farmers found the compaction process too slow and modified the compactor to be more effective by adding additional weight to the compactor plunger. Two compactors were made from metal, which allowed for a tighter compaction and the potential consolidation of different types of plastic.

Bales

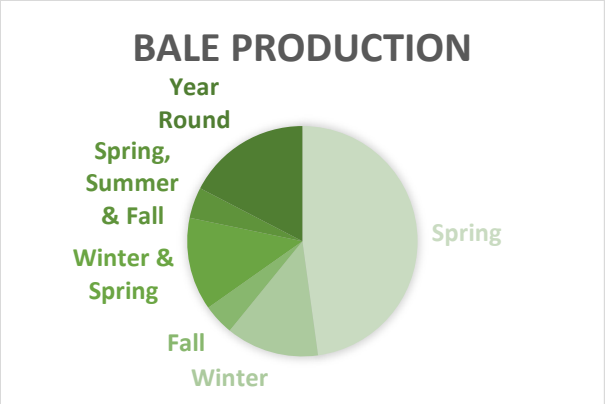
Of the 151 bales collected, half were evaluated for quality and composition. Most bales were bale wrap (78%), with bales also composed of silage/bunker covers, tote bags and mixed plastics. On a scale of 1 – 10, where 1 is lightly contaminated, bales averaged 0.384 for contamination by plastics, other than those intended in the bale and 0.438 for contamination by dirt, debris, and organics. This demonstrates a high purity and bale quality and is a critical metric for evaluation by end markets.

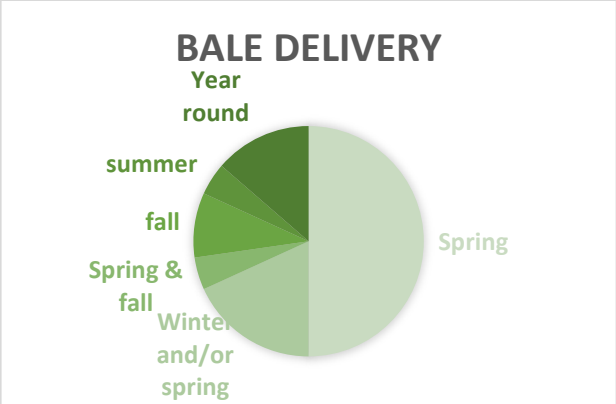
Additionally, 83% of bales were scored Good to Ok quality with respect to bale construction, indicating that they are transportable and either fully contained by twine or slightly distended from their original shape. Bales constructed using light twine or a mix of light twine and wire typically resulted in poor quality bales that would be difficult to transport without risk of spillage. Bale quality appeared to be influenced by several factors, the most significant being the rate of compression of the bale. For those which were highly compressed, the bales squeezed tightly to the ties holding it together. Loosely tied bales allowed the tie strings to shift and subsequently for the bale to lose shape and integrity.

Collection

The pilot initially planned on setting up centralized aggregation sites in each region where farmers would drop their bales off for pick-up. However, due to impacts from COVID and challenges around the end-use of recovered plastic, the pilot was scaled back, and bales were picked up directly on-site. This proved to be a significant logistical endeavor that wouldn't be sustainable (time or cost) with a larger program.

Considerations for centralized aggregation sites include the timing of drop-off events and the location between sites and farmers. Within the pilot, farmers compacted an average 3.3 bales per year, with a range of 1- 9 bales per year and would drive an average distance of 48 km to drop bales off. Most farmers use their plastic and compact their bales during the spring, with some plastic used during other seasons and would also prefer to deliver their bales in the spring, promptly after compacting. Aggregation site drop-off events could be timed to accommodate the majority of bale compaction, however single day collection events may not be convenient for farmers, especially those that make





more than 1 – 2 bales a year. Aggregation sites that offer more opportunities for bale drop-off will have to have adequate space to store the bales until a pick-up is scheduled.

Cost

In a fully optimized collection system where farmers deliver their bales to strategically located aggregation sites and semi-trailer loads of at least 40 bales are used to transport bales from the nodes to markets in Southern Ontario, it is estimated that shipping costs could be close to $120.00 per bale. However, it is unlikely that a second iteration of the program would realize a fully optimized collection system and assuming that centralized sites do not want to store bales for a prolonged period, it is likely that loads would be smaller and transportation costs higher as a result. There are also costs associated with staffing, centralized sites, travel, etc. that need to be considered as part of an overall stewardship model. In most cases, end-users are accepting the plastic at no cost, but there is no revenue associated within this framework.

End Users

Green Solutions Industries in London, ON, Modix Plastique Inc. in Lachute, QC and Tri County Plastics in Brighton ON currently have the capacity and capability to take bale wrap and silage wrap, with varying abilities to take other types of plastic (except for twine & tote bags). Contamination by water and organics do effect recovery, so correct bale consolidation is important.

Key Success Factors

The review of the Pilot has included consideration of the initial goals and objectives of the Pilot and has included the impacts of the COVID-19 pandemic. A critical analysis of these events, best practices from case studies in other jurisdictions and interviews with participants, stakeholders and end markets have yielded several commonalties and key elements which are essential to an ongoing, sustainable, agricultural plastics recovery system.

Key success factors and priorities are identified as follows:

- Funding
- End markets
- Localized processing
- Transparency and high value use
- Convenient collection and delivery
- Incentivized
- Independently managed – priority
- Timing

Funding

The key element to any stewardship program naturally relies on funding or a fee recovery mechanism to establish, manage and grow a functioning system. Ontario, like many provincial jurisdictions in Canada has been slowly shifting and evolving its resource recovery systems to shift increasing costs onto producers. Ontario, through the Ministry of the Environment, Conservation and Parks (MOECP), has developed EPR programs for used tires; electronic and electrical equipment; printed paper and packaging; and municipal hazardous and special waste. To establish an EPR program for agricultural plastics, the MOECP would need to:

1. designate ag plastics under the Resource Recovery and Circular Economy Act and,
2. direct ministry staff to develop a regulation to identify the specific plastic products, set recycling targets and outline the process for setting up producer responsibility organizations (PROs).

The Resource Productivity and Recovery Authority (RPRA) would then be responsible for overseeing the program, ensuring that all responsible producers are registered, monitoring performance against targets and enforcing compliance with the regulation.

Specific to a second iteration of the pilot or any further plastic recovery outside of an EPR program, funding is necessary to offset shipping costs and costs associated with the delivery of the program itself. Even with an informal grass roots approach to plastic collection, centralized aggregation sites across the North are at such a distance from each other and from the end-user that significant costs exist to move the plastic between points.

End Markets

There have been gains in chemical recycling and conversion technologies, however, these markets are not yet competitively established in Ontario. A 2019 Cleanfarms study estimating the potential agricultural plastic volumes available for recycling has helped to increase the visibility of recoverable resource opportunities within the agricultural sector. Overall, there has been a trend within the Canadian recycling space towards increased domestic capacity and a preference to keeping materials in Canada for recovery. A consistent, viable end-market is necessary to build confidence in a recovery program and to ensure that plastics are consolidated in the manner necessary for the end-user.

Localized Processing

Minimizing the carbon footprint of a diversion program is a concern for farmers; participants do not wish to send plastic overseas. This is a disincentive to participate for many farmers. Additionally, it benefits Canada and industry to retain high value manufactured products in Canada and retain the value for use domestically. Local processing typically translates to a lower cost of recovery and reuse. Inflation and global instability have resulted in skyrocketing transportation costs, and unpredictable bottlenecks at seaports. All these forces push towards a higher emphasis on domestic recovery options.

Transparency and High Value Use

Farmers want their efforts and participation in a recovery scheme to result in high value uses for the plastics they collect. Transparency is critical to overcome hesitation and concerns over end market use and motivate growth in participation. However, energy-from-waste (EFW) is not seen as high value use – plastic lumber and other high retained value uses are more desirable.

Convenient Collection and Delivery

Pilot program participants are willing to make the effort to bale plastic they normally have either burned or sent to landfill. Users will drive up to 50 km, on average, to get their bales to a collection location. Users want bale collection to be timely and convenient to access. One day collection events do not allow for convenience.

Most farmers find the bale compactor to be easy to use and efficient at densifying bale wrap. Additionally, as participants increase in numbers and bales increase in volume, collections can become more efficient with increasing loads, frequency and routes going to market.

Incentivized

Several participants advocated for an incentive-based system that would act as a reward for participating in the collection system. Suggestions included:

- A deposit return system whereby participants paid a recycling deposit upon purchase of the bale wrap and received a reimbursement based on how much of the original product was returned through the system.
- Another option proposed was a simple payment to the farmers for each bale of plastic returned for recycling. This system may be less feasible given the increased collection costs for a broad Northern Ontario based system, lack of funding and distance to market.

Additionally, incentives can also come from backstop legislation which bans disposal of plastics at landfill and requires participation in a collection scheme. This is often the most effective approach as it does not rely on a single individual's initiative.

Independently Managed

The pilot is currently a cooperative effort between NOFIA and OFA, neither of whom are mandated or experienced in operating a stewardship-based collection system.

Stewardship programs require several specialized tasks to be performed to operate sustainably, such as:

- Setting stewardship fees, collecting fees, auditing, and enforcement of sales-based levies
- Steward management and recruiting of new members
- Logistics and materials management
- Partnership development, including sourcing transportation contractors and end markets

Timing

Timing is everything! Currently, Ontario does not have a requirement, with backstop legislation mandating that stewards of agricultural packaging administer an EPR system for collection and end of life management. However, as has been witnessed in other provincial jurisdictions, such as in Manitoba, Quebec and P.E.I., interest is building to expand beyond residential EPR systems to also include other products such as agricultural plastics. When this occurs in Ontario is yet unknown, however the estimated time frame is five to ten years in the future.

Next Steps

The pilot demonstrated a basic proof of concept for plastic compaction and collection but did not have the time to developed into a soundly tested and optimized system. Under normal circumstances, a pilot would need a minimum of four years to develop efficient processes and achieve a more fulsome costing for collecting materials. This initial pilot was also heavily impacted by COVID, which resulted in a scaled back rollout of compactors, the loss of the initial end-user and the inability to grow awareness in the pilot through in-person events such as meetings and farm shows.

A further iteration of the pilot would allow for an assessment of the viability of centralized aggregation sites, the potential incorporation of a regional recovery option and incorporate some of the lessons learned from the first iteration.