Organic Waste Management in NL: Exploring Opportunities in Management and Utilization

Harris Centre - MMSB
Waste Management Applied Research Program

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MEMORIAL UNIVERSITY
February 2022

HARRIS CENTRE - MMSB WASTE MANAGEMENT APPLIED RESEARCH FUND

THE HARRIS CENTRE Memorial University

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Section I: Introduction

Why focus on organic waste? Why is this an important and relevant issue for NL?

In Newfoundland and Labrador (NL), organic waste accounts for approximately 30% of disposed waste – or 155,000MT annually (Government of NL, 2019, p. 79). As NL's government and industries reflect on waste management and plan for the future, organics management has emerged as an area of significant interest. As with other types of waste, emerging markets and innovative uses for different types of organic waste have prompted stakeholders to reevaluate how to exchange and utilize it.

Given the significant volume of organic waste being disposed of, paired with strong interest from stakeholders across the governmental, industry, academic and non-governmental organization (NGO) sectors, investigating organic waste management practices appeared a timely and relevant topic for this year's Waste Management Applied Research Program. When discussing potential waste streams to explore further, stakeholders noted existing knowledge gaps many wanted to address through this research. In early conversations about pursuing organic waste management research, project partners and stakeholders noted previous and ongoing work commissioned by government agencies over the past decade and the desire to see that work continued and mobilized.

Stakeholders noted many reasons to pursue this topic, including: the need for widespread organics management to meet diversion targets, environmental concerns over greenhouse gas emissions and shortening of landfill lifespan because of organics entering the landfill, and the potential environmental, economic, and social benefits of utilizing organic waste instead of landfilling it. As the world adjusts to the impacts of climate change, stakeholders acknowledge that NL is no exception and that utilizing organic waste can benefit the environment and the people of NL. Representatives from all sectors noted the benefits of composting not only to small-scale gardening, but the potential for it to contribute to the agricultural sector in NL, and by extension, its ability to contribute to better food security in the province. Representatives from industry also noted the opportunity to process different types of organic waste into high-value products such as soil amendments created from forestry residues and pharmaceutical products from organic fish waste.

Further, through research and as identified by stakeholders, organic waste is being managed in various innovative ways across Canada and the world. They noted the opportunity for this work to explore best practices in both NL and other jurisdictions to help fill existing knowledge gaps and uncover potential strategies to help advance organic waste management and utilization in the province. There was a clear desire to explore more environmentally, economically, and socially beneficial ways to manage organic waste without having to "reinvent the wheel" and learn from the experiences of other jurisdictions.

Challenges associated with organic waste that need addressing

Early research showed significant challenges that NL needs to address before it can adopt better organic waste management practices. Regional Service Boards (RSBs) noted several barriers to operating long-term organic waste management programs including: funding to coordinate ongoing curbside pickup, costs associated with retrofitting existing collection infrastructure (such as garbage trucks), staffing, and adjusting landfill and transfer station processing to accommodate the third stream.

In the absence of curbside organics programs across the Island, publicly and privately operated composting programs have emerged. There have been community composting pilots, supported by MMSB, which have seen considerable buy-in, but often the municipalities (or RSBs) did not have the resources to maintain them past the pilot stage despite interest from a portion of community members.

While some pilot participants have successfully navigated the transition, such as Grand Falls-Windsor,[1] jurisdictions stress the difficulty of providing organic waste management services due to a lack of resources. This need for better funding and resources, seen by many participants as the provincial government's responsibility, is an issue that needs to be addressed. It has been explored before, in the *Study of Options for Organic Waste Processing in Newfoundland and Labrador (Revised Final Report) (2014), colloquially known as the "Dillon Report,"* but considerable time has passed since the study recommendations have been released, without mobilization of the findings.

Another significant challenge, as identified by participants, is the lack of existing policy to support non-traditional uses and processing of organic waste in the province. Industry representatives noted their willingness to advance with the creation of waste-to-value products such as soil amendments made from forestry residue ash, but the inability to pursue this opportunity due to lack of adequate policy framework. There were similar stories from other enterprises and industries interested in utilizing their organic waste who also expressed the need for a non-prohibitive policy environment.

Opportunities associated with changing how we manage organic waste

There are both benefits and opportunities associated with changing how we manage and utilize organic waste in NL. We identified several specific potential opportunities and benefits associated with utilizing organic waste in NL. For example:

- Economic opportunities
    - Allowing and supporting waste-to-value operations across the province could lead to the development of new products, supply networks and markets. This would not only create valuable products for enterprise owners, but may offer potential job opportunities.
    - Participants noted the potential for compost, created through utilizing industrial organic waste, to see widespread use in several industries, such as agriculture.
- Environmental opportunities
    - Pursuing better organic waste management practices, especially waste-to-value ventures, addresses several components of the "waste management hierarchy," which encourages not only the diversion of organic waste but re-using of it as well.
    - Re-using organic waste in creative ways could provide environmental benefits by lowering the amount of compost (or agricultural inputs) being shipped into the province, extending landfill life, and reducing greenhouse gas emissions.
- Socio-economic opportunities
    - Smaller-scale composting programs, particularly those operated or supported by MMSB, NGOs, municipalities, or community gardens, have seen continued support across NL. Stakeholders noted that this can be partially attributed to the fact that these programs allow the public to come together and directly experience the benefits of their effort into diverting their organic waste.

[1] The municipality operates a community composting pile that is upkept by municipal employees. The initiative has seen continued participation from the community, who contributes feedstock to the compost and uses the end compost in their home landscaping.

- As compost developed from organic waste can be used in home gardening, there is also the opportunity for community members to be able to grow their food at a lower cost, contributing to food security.

These opportunities will be explored more in the following sections. However, as noted by interview and survey participants, the breadth of opportunity will be better understood when stakeholders come together in cross-sectoral discussions to identify existing and potential capacity to pursue waste-to-value ventures.

Project objectives – what we sought to learn

Knowledge gaps identified in early stakeholder conversations and document analysis of foundational documents in NL organic waste management informed the development of the project's main objectives and guiding questions. The main documents included in the landscape analysis were *Finishing what we started: Waste Management Strategy Review (2019); Study of Options for Organic Waste Processing in Newfoundland and Labrador (Revised Final Report) (2014), colloquially known as the "Dillon Report"; The Management of Organic Waste in Newfoundland and Labrador (MMSB 2012)*. See Appendix A for a brief analysis of each document. The Waste Management Applied Research Fund also funded several projects relating to organic waste, which contributed to the initial desire to investigate utilizing organic waste. See Appendix B for an overview of Organic Waste in NL: A review of available agriculture, fishery, forestry, and municipal waste literature (2017).[2]

This initial work highlighted the need to address the following

- Collect information about organic waste volumes by source and organics management (and exchange) sites across the province, whether regional service board (RSB) operated, private industry, or community composting hubs;
- Discover what information is missing, open questions, and uncertainties in organics management;
- Identify overarching cross-sectoral themes and concerns; and
- Highlight current or emerging opportunities for more effective diversion, management and/or utilization of organic waste materials.

Project process and timeline

The research objectives, as noted above, informed the creation of the project's research plan. As further explored in Appendix C, the project timeline included four phases, which sought to address the project objectives

1. *March – June 2021 – Exploring NL's organic waste management context & stakeholder interviews*
2. *June-September 2021 – Exploring best practices in other jurisdictions*
3. *September – November 2021 – Engaging with stakeholders in NL*
4. *December 2021 – February 2022 – Recommendations and discussion.*

[2] To explore other Waste Management Applied Research Fund projects go to: https://www.mun.ca/harriscentre/funding/waste/fundedprojects.php

Labrador context

The Labrador context is unique and their organic waste management needs and challenges are no exception. During initial research, it became clear that there is a clear lack of previous work and engagement with Labrador's communities on organic waste management that would work in their unique contexts. While there have been few select academic projects that considered the Labrador waste management context (e.g., the 2011 work by the Harris Centre *Consolidated Best Practices of, and recommendations related to, Landfills in Limited Access Communities of Newfoundland and Labrador*); Labrador was not included in the 2014 Dillon Report. It is important to meaningfully integrate Labrador's stakeholders into the discussion on what effective organic waste management means to them. However, it was determined that to achieve that goal, the deadline-oriented nature of this program would not allow for the full breadth of partnership and communication the context needs. **It is recommended that a Labrador-specific organic waste forum be held to begin a useful and relevant conversation on organic waste management in Labrador.**

Section II: What Did We Learn?

Organic waste volumes, sources, and management in NL

In NL, waste management is coordinated at the regional level. However, there can be agreements between municipalities and RSBs to opt-out or modify involvement in offered services (such as collection services). The vast majority of physical waste management infrastructure in the province is owned and operated by government institutions such as RSBs. As highlighted through the interview process, as of now, the extent of the private industry's involvement in waste management is mainly in the hauling (collection infrastructure) and wastewater treatment sectors. This is a significant contrast to other Atlantic provinces – NB, NS, and PEI have a higher level of private industry involvement. **Reaching out to Atlantic counterparts about their experience jointly delivering organic waste management services would be worthwhile if the project becomes focused on regional waste management.**

In regard to organic waste management, at present, no regions offer a curbside household organics collection that diverts to a separate section of a landfill – while landfills accept organic waste, it is not being managed (separated and processed) as its own stream. However, it is important to note that several regions have leaf-and-yard waste programs that have diverted significant volumes of organic wastes, which are utilized in landfill management as landfill cover. As highlighted above, the only landfill in NL that accepts untreated industrial organic waste is Sunnyside Landfill, located in the Eastern Region. Interviewees expressed differing opinions on the value of the Sunnyside Landfill for organics management. Some interview participants voiced concern about organics management practice at the site. However, because there are no other landfill sites to dispose of this material, others deemed it a "necessary evil" better than illegal dumping and other, worse, management practices.

There are two modern, lined landfills in NL - one in Norris Arm, which is owned and operated by the Central Newfoundland Waste Management, and the other in St. John's (Robin Hood Bay), which is owned and operated by the City of St. John's but services the Eastern region. As highlighted in the 2019 Strategy review, the waste management site inventory is as follows:

Newfoundland (Island)

- Eastern Region has 2 operational landfills (46 local sites have closed since 2002), 10 waste recovery facilities, and 1 transfer station

    - Landfills are Robin Hood Bay (operated by City of St. John's) and Sunnyside (operated by Town of Sunnyside)
- Central Region has 1 operational landfill (42 local sites have closed since 2002), and 7 transfer stations
- Western Region has 6 transfer stations (33 local sites have closed since 2002), and 1 privately owned MRF
- Northern Peninsula Region has 4 operational landfills (11 local sites have closed since 2002)
- Coast of Bays Region has 13 operational local landfills (no local sites have closed since 2002)
- Baie Verte Peninsula-Green Bay Region (which does not have an active RSB) has 12 operational local landfills (13 local sites have closed since 2002)
- Burin Peninsula Region has 1 operational landfill (18 local sites have closed since 2002)
- Discovery Region has 9 operational local landfills (1 local site has closed since 2002).

Labrador

- Western Labrador Region has 1 operational landfill
- Central Labrador Region has 2 operational landfills
    - Large facility in Happy Valley-Goose Bay and small local site for Mud Lake
- Northern Labrador Region includes the five Inuit communities, all of whom operate their own landfill (5 total)
    - However, all five communities burn their waste during the winter
- Southern Labrador Region has 12 operational landfills (Government of NL, 2019, p 89-100).

As highlighted in both the interviews and the Strategy Review itself, numerous reports have been commissioned on the cost and viability of waste management in the smaller regions over the past years. Overall, these reports have noted increased costs with changes in infrastructure and service delivery, except if they were to join with larger regions, particularly the Coast of Bays into the Central Region and the Discovery Region into the Eastern Region. Conversations and documents have highlighted the prohibitive nature of cost increases, and hesitation to increase fees played a significant role in why the 2002 Strategy had not met its targets. Additionally, it was stressed that although residents and enterprises want improved service, they are "not willing to pay for it," particularly when it comes to organic waste processing facilities.

<u>Grassroots organic waste management in NL</u>

As identified through interviews and document analysis, numerous networks contribute to informal organics diversion in the province. These networks are becoming increasingly formalized as municipalities and regions recognize the value of collaborating with NGOs and the MMSB to deliver backyard and community composting programs. Developed to help support and promote public education and waste diversion programs in NL, the MMSB has integrated organic waste diversion into their mandate. Over the past decade, MMSB has supported academic research into organic waste management and community composting across NL (through funding for backyard composting and community composting pilots). Both MMSB employees and NGO participants noted a steady, if not increased, interest in backyard composting over the past few years. Community composting is also popular in certain areas of the province, particularly in places like Grand Falls-Windsor, where the municipality operates the community composting pad/pile.

Beyond the MMSB's influential work, there has been enthusiastic involvement from NGOs (and MUN) across the province. In St. John's, the MUN Botanical Garden has partnered with the City of St. John's to deliver backyard composting courses for a decade. This is a formalized partnership, as proof of completion of the MUN Botanical Garden's composting course is mandatory to be eligible to buy a composting bin (at a reduced price) from the City of St. John's. In Corner Brook, the Western Environmental Centre (WEC) and MUN Grenfell have contributed to an awareness of and buy-in for organics diversion and composting. Across the province, there is a symbiosis between composting programs and aiming to improve food security in NL. NGOs like Food First NL have long-supported composting education. Circularly using organic waste helps reduce food waste and provides nutrient-rich compost that can be used to grow new food here in NL. Lastly, participants noted that there are many informal networks across the province, where neighbours will give their organics to nearby small-scale farms/gardens for composting.

Interviews

Conducting interviews with a diverse group of relevant stakeholders contributed significantly to our understanding of the NL organic waste management context. We spoke with practitioners from the government, academic, industry, and non-governmental sectors to gain a wholistic view of the organic waste management experience in NL. Several main themes and concerns emerged during the interview process:

- The need for clear enabling policy
- The need to address municipal solid organics management strategy
- Evaluate options for organics waste management at the community and regional level.
- The importance of partnerships in organic waste management and utilization
- Supports to help grow the bio-economy
- Need to identify cross-sectoral knowledge gaps.

These conversations highlighted practitioner's desire for better organic waste management practices, in both organic waste collection service delivery and utilization of organic waste. Given the substantial financial and policy barriers and overall complexity of implementing a curbside organic program, and the absence of current work on the primary focus of the work shifted to grassroots opportunities in organic waste utilization.

See Appendix D for an in-depth exploration of the interview methodology and main themes.

Survey

After learning more about the experiences of other jurisdictions as they work towards better practices in organic waste management and utilization, we revisited the NL context. In this round of engagement, we created a short survey to ask stakeholders across NL about their knowledge of or experience with organic waste exchange and utilization networks in their region.

In terms of geographic distribution, we saw representation from across the island of Newfoundland, with clustering in the Avalon and Humber Valley regions. There was also a diversity in professional background with 43% of respondents in the government sector, 36% from industry sector, and 21% from NGO sector. On registration data there was also a diverse age range amongst participants. This combination of diverse geographic, professional, and age backgrounds provided a balanced look at organic waste-to-value networks across the island of Newfoundland.

Using the Harris Centre's online engagement platform we designed a website housing information about the project and organic waste-to-value definitions and examples along with the short four question survey. We asked the following:

- What organic waste stream do you think holds the greatest potential to be managed or reused in ways that contributes to your region's economy? (Rank options - 1 being greatest potential)
- Do you know of any current or past initiatives seeking to manage or utilize organic waste in ways that contribute to the social or economic development of your region (e.g., community composting program, products from industrial waste, etc.)?
- What do you think are potential organic waste management/utilization ventures that would have the highest chance of success in your region?
- Who are potential partners in your region to help advance these solutions?

The main themes raised in survey responses are as follows. For a shortened overview of survey answers, see Appendix E.

Question 1

As with other waste streams, there is an array of industries and individuals generating and disposing organic waste. In the first question we aimed to gain an understanding of what stakeholders saw as the which dream with the greatest potential to be harnessed and managed in a way that contributes to their regional economy. We asked participants to rank in order of importance forestry, agriculture, residential leaf and yard waste, residential food waste, food wastes from hospitals/schools/businesses, and fisheries. Overall, the highest ranked stream residential food waste followed by agriculture and fisheries.

Throughout the project many participants both through the survey and interviews noted the importance of harnessing residential food wastes, but it was interesting to see that when asked directly stakeholders noted that the agriculture and fisheries along with forestry industry hold many opportunities in their region. Many of the answers pertaining to forestry and agriculture stemmed from the West Coast of the Island, highlighting a potential regional cluster. There is a clear desire to include industry stakeholders in waste-to-value conversations, however there has been difficulty connecting with agricultural representatives in the past. This highlights the need for more formalized, long-term, communication channels with agricultural producers.

Question 2

Before moving to identify potential opportunities for waste-to-value networks, we wanted to see if stakeholders were aware of past or existing initiatives in organic waste management or utilization that contributed to the social or economic development of their region. Participants identified an array of programs from past and present that are focused on utilizing organic waste. The majority of initiatives listed by participants were backyard or community composting efforts, such as the backyard composting projects supported by MMSB. The identified initiatives and stakeholders were backyard composting bin programs coordinated by municipalities (across the island), private enterprises (R&D Diversions, Island Compost, Battery Cafe, Lester's Farm Chalet, 3F Waste Recovery), and NGOs (Foodrescue.ca, St. John's Farmer's Market, Georgestown composting pilot project, Evergreen community composting).

These answers allowed us to discover that beyond backyard and community composting pilots, select businesses, and targeted NGO programming, there are not many (to our knowledge), ongoing

waste-to-value partnerships or enterprises on the Island. However, through this question we collected a list of diverse stakeholders who could be included in future waste-to-value network discussions, and provide valuable contributions based on their experience in different regions across the Island.

Question 3

The third question we asked participants to think a bit outside the box and provide insight into what organic waste management/utilization ventures would have the highest chance of success in their region. on what they thought had the greatest chance of success in their region. Within the concentration of participants from the government sector it was not a surprise that expanding curbside pickup of residential organic waste was highlighted as one of the best opportunities to divert organic waste and provide feedstocks for waste-to-value enterprises. Followed by the recommendation for curbside pickup, was the sentiment that community compost drop off centers would increase participation in composting programs and offer the best chance for increasing feedstock volume.

Beyond residential participation, partnerships with agricultural producers and those with fish waste were identified as a potential key for developing successful organic waste utilization ventures. It was also noted that developing soil amendments, animal feed, or other organic products (from forestry and other agricultural wastes), which are useful in agriculture, would be among the highest and best uses for organic waste-to-value products.

Although an outlier in the discussion, but still raised, was the concept of using organic waste as a feedstock for waste-to-energy ventures, which is a theme that has come up recently in waste management discussions across the province (extending beyond just the organics stream).

Question 4

The final question of the short survey asked participants to reflect on who they thought were potential partners that could help advance organic waste utilization efforts in their region. Many participants noted Newfoundland's governmental, academic, and nongovernmental organizations, specifically; MMSB, provincial government, the Harris Centre (and other departments at Memorial University), regional service boards, R&D Diversions (for Humber Valley region), FoodFirst NL, Georgestown community composting pilot project, St. John's food policy council, Econext, and industry partners.

Although there are limits on the long-term supports these institutions can provide, they have significant capacity and knowledge that could support waste-to-value network development discussions. Also, with increased communication amongst stakeholders and institutions, there are potential opportunities to better share resources or create long-term institutional supports for waste-to-value efforts in the province.

The survey responses provided a look into perceived organic waste management and utilization at the regional level, further contextualizing the organic waste utilization experience across the island. Participants provided important insights, especially which streams they believe hold the most opportunity, and potential regional partners. This information will be useful as the Harris Centre and industry partners work to facilitate a forum to discuss organic waste utilization in NL.

Other jurisdictions

After gaining a better understanding of organic waste management and utilization policy in NL, we sought to learn more about best practices that could apply to the NL context. For this phase of the project, we explored circular economy initiatives and businesses in New Brunswick, Scotland and the Netherlands and connected with several Canadian provincial policy representatives to learn more about potential options for NL.

Non-governmental circular economy initiatives

Upon scanning for circular economy "success stories", it became clear that many formalized networks are still being developed, even in Europe, which is frequently hailed as decades ahead of the North American context. Circular Tayside (Scotland) and Circular Friesland (Netherlands) emerged as relevant, context-similar successes that could hold helpful lessons and approaches for NL stakeholders and organizations. Additionally, Envirem Organics emerged as an example of a successful waste-to-value business in Atlantic Canada. To learn more about these examples, see Appendix F.

Main lessons from these examples:

- Early collaboration amongst cross-sectoral stakeholders is key to developing the kind of network needed for waste-to-value operations to have a chance to succeed.
- When examining cases of multi-stakeholder cross-sectoral network development, these initiatives take a long time to come to fruition. The Friesland circular economy initiative, for example, has been in development since 2014 and is not yet fully formalized. This highlights the **need for patience and dedicated project champions**.

Cross-jurisdictional policy scan

With help from our project partner, MMSB, we contacted provincial waste management policy personnel from across Canada. We reached out to all Canadian provinces and territories and heard back from Nova Scotia, New Brunswick, Prince Edward Island, Ontario, Saskatchewan, British Columbia, and the Yukon. Our provincial counterparts provided insight into their policy experiences, relevant policy documents, plans for organic waste utilization policy, and notable 'champions' in organic waste utilization in their province. For the index of provincial policy documents, see Appendix G and for the list of noted 'champions' see Appendix H.

Main findings:

- A scan of organic waste-related policies in Nova Scotia, New Brunswick, Prince Edward Island, Ontario, Saskatchewan, British Columbia, and the Yukon showed that while there has been **steady advancement of organic waste management and organic waste-to-value enterprises, it has been largely in absence of overarching organics strategies**.
- Of the provinces we connected with, many have organic waste policy advancement agendas and are developing policies directly related to organic waste diversion, reduction, and utilization. NL does not have plans to develop new organic waste-specific policies in the near to medium term, in stark contrast to other provinces consulted. (As these plans are internal and, in some cases, very early stages, we cannot share specifics).
- **A "Red tape reduction review" would be a useful starting point for NL.** This type of review seeks to identify what policies or lack of policy impedes organic waste-to-value efforts. Saskatchewan recently undertook a red tape reduction review in response to consultation on proposed waste management regulations. This methodology could be

adopted to explore, in-depth, all "red tape" to implementing organic waste management and utilization policies in NL. The upcoming waste-to-value forum will be an excellent opportunity to hear from businesses and producers themselves as to what they have experienced as "red tape" so the process of targeted and coordinated red tape reduction can begin.

What is missing and uncertainties

A limiting knowledge gap in NL organic waste management is that there are currently no accurate estimates of how much organic waste is generated and disposed of in the province. While RSBs and municipalities have a sense of how much organic waste is disposed of at their landfills/dumps, few estimates exist for industrial organic waste, as the Sunnyside landfill - the last landfill accepting industrial organic waste - does not have weigh scales. Although there is an opportunity to attempt to estimate the volumes based on previous estimates and new ballpark estimates gathered through the interview process, the results will not be as comprehensive and accurate as they should be to inform organic waste management decisions reliably. The last extensive investigation into organic waste generation and disposal volumes was in the 2014 Dillon Report, seven years ago. Without knowing the volumes of organic waste disposed of in areas across the province, planning for future organics management infrastructure is much more difficult.

As stated in several stakeholder conversations, to get as close to the true generation and disposal volumes as possible – especially in industrial organics – there would need to be a separate project done whereby researchers contact all forestry, aquaculture, fisheries, and agriculture operations to gather estimates. A task of this scale would require its own project and is something that an *Applied Research Fund* principal investigator could be encouraged to undertake.

The other large gap was an understanding of where informal circular economy networks exist, if any, across the province, and what would need to happen for there to be advancement in the waste-to-value industry. These networks play a significant role in diversion levels in the province; without them, organics diversion would rely solely on RSB managed services, none of which currently offer organics separation. Although this is still considered a gap, throughout the course of the project it has been

Overarching cross-sectoral themes

As explored above, there have been several overarching themes emerge over the course of the project. Perhaps the most prominent theme is that all sectors are eager to move the needle on this issue and work to advance organic waste utilization in the province. Many agree that NL is behind the rest of the country and the lack of organic waste management needs to be addressed. There is an overall perception across sectors that there are roadblocks to implementing new practices, specifically the provincial government's capacity and desire to address this issue, and restrictive policies. Many agree that there needs to be a "point person" or organization that stakeholders can contact, so that they can learn more about the opportunities available and develop networks. There are several organizations that may be able to host such a position, and stakeholders from across all sectors noted that they know of people within their specific sectors that would have an interest in contributing to the discussion on organic waste-to-value.

Emerging opportunities in utilization

Through survey and interviews we gained an understanding of some organic waste management and utilization ventures across the Island, but the waste-to-value forum presents an excellent opportunity to identify current possibilities in organic waste utilization networks.

Case studies, particularly the Friesland example, highlights the importance of having interested and engaged stakeholders to catalyze discussions. Also integral in the Tayside case – groundswell started with industries, chambers of commerce coming together. Interactive Tayside has a map with a network of businesses who participate in the circular economy and what they bring to the table within the Dundee/Perth Region. This is an integral platform as it highlights clear examples, with contact information, of potential partners in waste management.[3] Getting a better sense of these stakeholders and creating this type of web-based map platform would be a good continuation of this initial work.

Additional finding

Outside the scope of the streams included in this report, the concept of composting human bio-solids is something that a single private company with an infrastructure network across the Island, is keen to advance. Although this approach would require potentially different policy amendments than other industries, there is a desire to pursue it and the company may be posed to influence organic waste management in significant volumes and be a good partner to smaller entities.

Section III: Recommendations and emerging questions

As explored above, the knowledge gathered throughout the project provided an understanding of the NL and Canadian context. The lessons learned, limitations, and remaining gaps highlighted above guided the development of several high-level recommendations

1. Improved measuring and reporting of volumes of organic waste being generated and disposed
2. Incentivizing changes in practice
3. Connect stakeholders
4. Provide long-term access to institutional supports
5. Utilize organic waste in food production
6. Investigate retrofitting existing infrastructure to support waste-to-value operations.

This section will further explore the rationale for each of these recommendations.

Improved measuring and reporting of volumes of organic waste being generated and disposed

Throughout the project, a quote heard time and again was, “you can’t manage what you don’t measure.” Since the development of the Provincial Waste Management Strategy in 2002, there has been discussion on the importance of diverting waste and limiting the amount of waste going into landfills across the province. However, without source separation and weighing of organics entering landfills, we do not have a precise estimate of how much organic waste is being disposed of in the province, making it harder to plan for its future management. Although there have been context appropriate estimation formulas developed by MMSB and in consultant reports such as the Dillon report, for residential and ICI sectors, there remains a significant gap in estimating industrial organic waste. Beyond the implications for landfill timeline planning and residential/ICI planning, this poses difficulties when trying to develop

[3] https://circulartayside.co.uk/circular-tayside-map/

waste-to-value networks and enterprises. Without knowing disposal volumes, it is hard to assess the feasibility of waste-to-value operations.

To ensure informed discussions about industrial organic waste utilization we need more accurate data. Beyond the Sunnyside Landfill, there are no widespread organic waste weighing and reporting requirements or practices. Although the Sunnyside Landfill Certificate of Approval mandates the reporting of volumes entering the landfill (Sec. 9), as per discussions with the regional Environmental Protection Officer, there are no scales at the Sunnyside landfill or records of volumes in trucks or cubic yards. The only volume estimate for waste entering the landfill was provided by a representative from the Town of Sunnyside, the operator of the landfill, an estimated 3000 metric tons of organic waste each year, comprised mostly of poultry waste and small loads of fish shells from the Avalon region. While there may be generation and disposal volumes amongst different sectors and enterprises, most are broad estimates or kept track of by individual businesses. A potential path to gaining a better understanding of the potential volume of organic waste available to be repurposed would be to contact every known business in each sector for their volumes. Collecting this inventory and having a more accurate volume estimate would certainly aid these discussions, however, it was not within the scope of this project as the timeline and resources did not allow for this significant undertaking.

Therefore, it is recommended that this type of organic waste registry be developed as soon as resources allow. It is important that the agencies and individuals who undertake this work have the capacity to engage with industry stakeholders and have a well-developed cross-sectoral network. Given the vast geographic distribution across the Island, with many smaller-scale enterprises in remote locations, it is important to have these existing connections to assist in locating as many producers as possible – especially in the agricultural sector.

Incentivizing changes in practice

As explored in the policy and jurisdictional scan section, advancements in organic waste management have been achieved by changes in practices catalyzed by either policy changes or market-based forces. As seen across the country, there can be considerable success when the two are combined, specifically in the case of the company Envirem in New Brunswick. However, through consultation, it appears that at present there is not enough market pressure alone to drive substantial changes in practice. However, interview and survey participants also noted that organic waste management is “not a priority of the current government, and there are no forthcoming changes to waste management policies in the near future.” Limited financial capacity is often noted as one of the primary reasons the government is not looking into organic waste management policy solutions at this time. The absence of an overarching organic waste strategy in the province presents a challenge to advancing organic waste-to-value enterprises but as seen in other jurisdictions, is not an insurmountable barrier.

For example, New Brunswick does not have an overarching change in industrial landfill policy in the late 1980s is a good example of a targeted action that incentivized a change in practice. Upon the change, policy stated that when an industry’s landfill was full, they were required to site and build a new state-of-the-art landfill (which cost around $2 million at the time). This led industry receptive to more affordable disposal options. An integral stakeholder to the successful change in practice was Envirem organics. They charge a lower fee for collection and processing of organic waste than it would cost industries to maintain their own landfill and pay tipping fees. Although NL doesn't have the same type of

industrial landfill as New Brunswick, the concept of supporting a company like Envirem, which processes industrial organic waste from the source, is one that should be explored and supported in NL.

In the case of the Island of Newfoundland there are potential targeted policy amendments and actions that could be made to incentivize changes in practice. For example, Newfoundland and Labrador it is one of the few jurisdictions in Canada where there are many permits to dump fish waste at sea because there are no viable on land solutions to deal with this waste. As advised by interview participants, the permits state, however, that once there is a viable alternative land-based solution to dumping at sea then there will need to be changes in practice. For example, the NL government or other institutions could support the development and growth of enterprises that would utilize fish waste to prevent this dumping at sea. Working within the parameters of existing policy, partnered with institutional supports, could help NL waste-to-value enterprises access another reliable stream of organic waste to support their product development as they work to expand or create new markets.

Connect stakeholders

Over the course of the project, one of the main themes across all jurisdictions was the importance of stakeholder and cross-sectoral collaboration. In surveys and interviews it was clear that members from all sectors are excited about finding better ways to address organic waste, but agree that can't happen in silos. From network development, market identification, and even developing waste-to-value products, ongoing communication is essential. Further, as seen in the case study examples and cross-jurisdictional scans, cross sectoral communication is essential when developing regional circular economy networks.

Identifying all interested and relevant stakeholders is a significant undertaking, as organic waste management spans many sectors and geographies. One of the early 'wins' of this year of the WMARP has been the identification of potential stakeholders. After learning of the willingness of stakeholders to investigate organic waste-to-value initiatives, members of the Harris Center team connected with industry representatives to discuss the idea of holding an industrial organic waste-to-value forum for interested stakeholders to come together. The idea was met with enthusiasm, and planning is currently underway for the waste-to-value forum to be held at Memorial University Signal Hill Campus in the Spring of 2022. Actioning this recommendation before the release of this report has been a significant achievement of the WMARP program and highlights the relevance of organic waste management in NL and stakeholders' enthusiasm for better utilizing organic waste.

Provide access to long-term institutional supports

Although stakeholders are enthusiastic about discussing organic waste utilization in the province, many agree that there needs to be long term supports in place to maintain these relationships. While larger institutions have been helpful partners in the past, it has usually been on a contractual or short-term basis. Participants noted that overall stakeholders do not have the capacity to maintain these working relationships on their own, despite their desire to do so. Many advised that for there to be strides in organic waste-to-value network development there needs to be long-term supports in place. This 'support' could take a variety of forms, but many noted that there needs to be a central "point person" who can broker and support this conversation. There are different institutions across the Island that could host such a position, and the determination of which would be best or most willing to take a leadership role in this discussion could be discussed at the waste-to-value forum.

Utilize organic waste in food production

There are many ways to utilize organic waste, and each of these uses has associated benefits. Given the potential for a combination of economic, environmental, and socio-economic benefits, using compost (or inputs developed from organic waste) in agriculture or food production is recommended. Using organic waste in this "circular" way has many co-benefits and working with the agricultural sector was a priority area amongst survey and interview participants. Food security is a prominent issue in NL and finding ways to support healthy soils and food production on the Island will become increasingly important in the climate change era.

While there is potential for agricultural producers across Newfoundland to be the end users of compost and other waste-to-value products, they are also positioned to be key contributors to the composting feedstock (whether through animal deadstock or plant material). and inputs developed by organic waste. However, at present this is largely based on the assumption that NL agricultural producers would be interested in contributing to or using these products. Producers may have concerns about these products – or eager to have them – but at present we haven't spoken with enough producers, or their representatives to make that determination. This is mainly due to geographic distribution, many smaller-scale operations, and how busy they are, it can be difficult to connect with agricultural producers on an ongoing basis. Given the importance of these stakeholders in waste-to-value discussions, an especially diligent effort should be made to collaborate with them and their representatives. Further, it became evident throughout the project that it would be worthwhile to explore supports to increase the capacity for NL's agricultural producers to hire representatives to communicate their interests on their behalf.

Investigate retrofitting existing infrastructure to support waste-to-value operations

Conversations throughout the first year of the project highlighted past struggles in siting and developing industrial composting operations in the province, particularly on the Avalon peninsula. As there are environmental and health hazard concerns associated with these operations, there can often be pushback from other stakeholders and communities when one is proposed. Repurposing old or abandoned sites is a great alternative to building a new site for many reasons, as it saves time, money, and environmental impacts of commissioning a new site. An interesting example of a potential site that could be repurposed on the Avalon Peninsula would be the Sunnyside Landfill. While the landfill is slated for closure in the near future, it would be a good site to use for a commercial composting location as it is already properly sited and established. Identifying other such sites across NL to help lower the costs and timeline associated with creating a waste-to-value enterprise would be a worthwhile activity for stakeholders at the waste-to-value forum.

Unanswered and emerging questions

While there were many questions answered and addressed by this work, there are large questions that remain unanswered. Many of these questions relate to better volume estimates, increasing capacity to pilot and operate waste-to-value operations, and connecting stakeholders. However, as learned from other jurisdictions and circular economy networks, there are "soul searching" questions that will need to be explored by stakeholders as the discussions on how to utilize this waste stream progress. As explored in this work, there are an array of ways this waste can be used, benefitting different stakeholders, which begs the question, what is the highest and best use for organic way, and how can that be determined? The limited feedstock could lead to competition between the waste-to-

value industry and smaller-scale agricultural producers and social enterprises. How would stakeholders navigate that/who should get priority?

If there is a desire to expand industrial composting efforts to create compost or other waste-to-value products, should NL's industry sector look to attract companies with existing knowledge, capacity, and infrastructure from outside NL to operate in the province? While supporting the growth and development of NL's enterprises, a company like Envirem, which is based in the region and has an existing infrastructure, supply, and market network could catalyze this effort as they already have the in-house capacity. Stakeholders may not be interested in attracting an outside company to the province, but it is worth discussing at the waste-to-value forum.

Although more related to the discussion on commercial and ICI organic waste disposal, is large scale diversion, supported through municipal/RSB collection likely in a tipping-fee based system where landfills generate funds based on volumes entering the landfill? Through interviews several participants raised concern that there is even less incentive for RSBs to operate this large-scale diversion as it would not only cost a significant amount to operate the service, but they would also lose from one of their main sources of revenue, tipping fees typically paid by businesses when dropping off loads of lumber and other materials. Navigating the desire to increase diversion, but the struggles of doing so in a tipping-fee based model is something that needs to be explored, as it is especially relevant to the smaller more remote landfills in the province.

Another high-level question could be explored at the waste-to-value forum is about the importance of GHG reduction as a main benefit of organic waste diversion/utilization. One of the first and strongest arguments in support of diverting organic waste was the positive impact it has on leachate and methane reduction in landfills. However, professional discourse on the actual impact of coordinating organic waste diversion programs is not as significant as previously thought. As emissions reduction is among the main drivers for continuing programs, there may be difficulty in continuing enthusiasm for it, particularly from governments, but a question to be explored is should significant emissions reduction be the primary goal of organic waste management in NL? There is potential for wider GHG reduction than accounted for in traditional models, as utilizing organic waste as agricultural inputs could reduce the volume of product being imported into the province, which generates emissions. Further, does the pursuit of significant emissions reduction outweigh the other benefits of pursuing the waste-to-value model, which has the potential to provide more economic and socio-economic benefits.

Lastly, there have been outside conversations about the use of waste in general, and many are focusing on the potential for waste to be used as fuel for energy production. While this offers its own host of benefits, is this the best use of the limited organic waste stream, when it has other uses such as agricultural inputs which could have a much better impact long-term. That type of decision and direction will be up to stakeholders.

Section IV: Conclusion

As explored above, it is evident there is potential to better manage and utilize organic waste here in NL. Throughout stakeholder engagement, there was clear enthusiasm for the topic and adopting better organic waste management practices in NL. As demonstrated in this report, stakeholders noted many reasons to explore alternatives in organic waste management, including the potential to extend

landfill lifespan, lower greenhouse gas emissions, meet diversion targets, and other economic and social benefits possible from utilizing organic waste. As highlighted by stakeholders, there are various ways that organic waste can be used by industry, such as commercial composting for agricultural purposes, high-value soil amendments, and even pharmaceutical products.

This work sought to address knowledge gaps and provide recommendations on how to advance the discussion on adopting better organic waste management practices. Through interviews, a survey, and taking into account other jurisdictions' experiences, we formulated the following recommendations:

1. Improved measuring and reporting of volumes of organic waste being generated and disposed
2. Incentivizing changes in practice
3. Connect stakeholders
4. Provide long-term access to institutional supports
5. Utilize organic waste in food production
6. Investigate retrofitting existing infrastructure to support waste-to-value operations.

As explored in detail above, these recommendations are based on NL's context and aim to provide a possible template under which to continue this important discussion. Some of these recommendations are already being actioned at the time of writing, specifically, connecting stakeholders. Bringing stakeholders together to discuss their issues, goals, and priorities will help build partnerships and lay the groundwork necessary to know what long-term supports are needed and what changes in practices they want to work toward. The upcoming Organic Waste-to-Value forum being held by the Harris Centre in the spring of 2022 will provide the venue necessary to stimulate this discussion and develop cross-sectoral connections so stakeholders can work toward creating organic-waste-to-value opportunities.

Section V: Appendices

Appendix A – Overview of NL organic waste management documents

Solid Waste Management in Newfoundland and Labrador: Finishing What We Started (2019)

Since 2002, solid waste management in Newfoundland and Labrador has been guided by the *Provincial Solid Waste Management Strategy*. As highlighted in the 2019 strategy review, *Solid Waste Management in Newfoundland and Labrador: Finishing What We Started, the* 2002 strategy was centred on five main action items;

1. Increasing waste diversion
2. Establishing a regional approach to waste management
3. Utilizing modern standards and technology
4. Maximizing economic and employment opportunities
5. Public education (Government of NL, 2019, p. 1).

The comprehensive report explores the actions taken to meet the targets of the 2002 strategy, noting both successes and shortcomings in implementation. While there were significant successes, such as closing many unsafe unlined landfills across the province, there has been difficulty reaching diversion targets. The 2002 strategy set the diversion goal at 50%, but at the time of the NL waste profile in 2016, the diversion rate was half that, at 25% (Government of NL, 2019, p. 71).

Regional approaches to waste management have been implemented more thoroughly since the introduction of the 2002 strategy. While this has allowed for diverse approaches needed in Newfoundland and Labrador's diverse communities, it has also led to several challenges, particularly in remote areas. The delay in implementing practices and infrastructure outlined in the strategy can be primarily attributed to the increased household cost needed to diversify waste management, the capacity required, and servicing large geographic areas.

The review also considered the status of organic waste management in the province and how the public felt about pursuing organics waste management. Of the public engagement survey respondents, "Seventy-nine 74%) agree keeping organic waste out of landfills is important," (Government of NL, 2019, p. 45). The report highlighted a geographic component to the answers as many of the respondents who were neutral or did not feel diverting organics was important reside in the western regions (Government of NL, 2019, p. 45). Lastly, as shown in figure 1, nearly half of residents supported the development of "organic waste diversion and composting programs" (Government of NL, 2019, p. 45). Among those who did not support organics programs, the most cited reasons were cost and the need to address present waste management issues before adding additional streams.

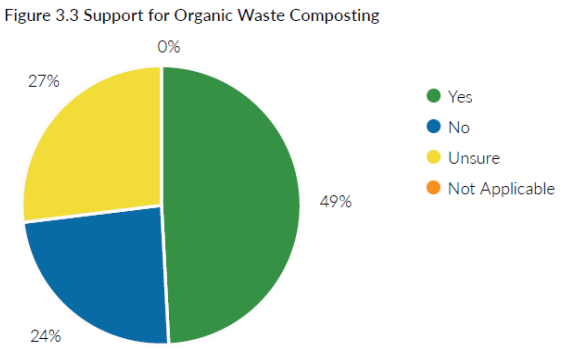

Figure 1 Support for Organic Waste Composting in NL (Government

Although organics management was not the primary focus of the strategy review process, it was given significant consideration. This focus was merited as it is clear organics management holds many opportunities to help NL meet diversion targets, utilize waste, and encourage economic development.

"Dillon Report" (Study of Options for Organic Waste Processing in Newfoundland and Labrador) (2014)

Released in 2014, the *Study of Options for Organic Waste Processing in Newfoundland and Labrador* report – known as the Dillon Report – is a fundamental document in organic waste management in NL. Referred to by most conversation participants, the Dillon Report provided a comprehensive analysis of the state of organics management in NL. The report also provided a series of projections using waste forecasting, geographic constraints, and other contextual factors, along with available technologies. Using the projections and available technologies, the report presented seven scenarios for organic waste management in the province.

The report also produced an evaluation of infrastructure needed to accommodate organics management in the province, with the proposed solutions costing an average of $138M in NPV ("net present value"), which, in this case, integrates projected inflation through to 2045 based on the project's timeline (Government of NL, 2014, p. xiii, 74, 78, 81, 84, 87, 90, 93). Government employees and regional waste management officials continually cited the Dillon Report proposed scenarios as one of the most significant hindrances to action on organics management as it put "such a large price tag" on it without providing phased implementation or priorities plan. Participants said the lack of a priorities plan and potential phasing made it "too large" for a government to take on. The large price tag was especially influential given that it was released at the beginning of an economic downturn which limited government funding.

The report provided the most recent comprehensive account of how much industrial (forestry, aquaculture, agriculture, fisheries) organic waste is being *generated* in NL. The baseline industrial figures provided in this report are still the referenced benchmarks, with only a few new statistics available from conversation participants. Although the report assembled and presented estimates of how much organic waste is being generated, there are still no estimates of how much is *disposed* of in NL landfills. One of the most significant limitations of the project was that the scope was limited to eight regions and did not include remote areas outside of the boundaries of the following regions (all on the island of Newfoundland):

1. Discovery Regional Service Board (DRSB)
2. Burin Peninsula Regional Service Board (BPRSB)
3. Central Regional Service Board (CRSB)
4. Coast of Bays Waste Management Corporation (CBWMC)
5. Eastern Regional Service Board (ERSB)
6. Baie Verte – Green Bay Region (BVGB)*
    - revised from Green Bay Waste Authority (GBWA) following the review of the draft report
7. Northern Peninsula Regional Service Board (NPRSB)
8. Western Regional Service Board (WRSB)

Although the proposed scenarios may not have been appropriate for the Labrador context, it is important to note that none of the regions in Labrador were included in the project scope.

The Management of Organic Waste in Newfoundland and Labrador (2012)

The Multi-Materials Stewardship Board – NL's Crown agency mandated to work to advance waste diversion in the province – released the report *The Management of Organic Waste in Newfoundland and Labrador* in 2012. The report explored the MMSB's experience facilitating backyard and community composting programs and cited lessons and successes to that point. The report notes that backyard composting, although popular, was seen as less convenient than alternatives which may have impacted long-term participation (MMSB, 2012, p. 4). There were also continuity issues with community composting because, although popular, there are costs and other demands to deliver the

service long-term.

The report also evaluated four types of organics management technologies: windrow, cover piles, in-vessel, and anaerobic digestion. These approaches vary in cost, upkeep costs, and land area needed. Open windrow is the lowest-demand of the technologies, with in-vessel being highly advanced and having a much higher operating cost. The estimated operating cost of an open windrow facility is $15-25/MT, with in-vessel costing an estimated $100-130/MT (MMSB, 2012, p. 11). Evaluating these technologies was important as it highlighted the importance of selecting appropriate infrastructure based on the resources available. This interest in exploring new and existing technology options helped shape the study that would become the Dillon Report (Government of NL, 2014, p.ii).

The report also explored the different organic waste streams (residential, ICI, and industrial) and provided the benchmark organics generation statistics before the Dillon Report. The "streams", as defined and explored in the report, helped shape the initial phases of this project as well. Overall, the report served as a catalyst for projects in the following years and provided the baseline knowledge needed to inform further research.

Appendix B – Overview of Organic Waste in NL 2017 Applied Research Fund project

Organic Waste in NL: A review of available agriculture, fishery, forestry, and municipal waste literature (2017)

The report *Organic Waste in NL: A review of available agriculture, fishery, forestry, and municipal waste literature (2017)* by Lesley Butler, Daniel Altdorff, Erika Young, Lakshman Galagedara, Kelly Hawboldt, Robert Helleur, and Adrian Unc explored the utilization of organic waste in NL. This report was completed as part of the Harris Centre – MMSB Waste Management Applied Research Fund. This project demonstrates how research funding can help address gaps in knowledge and identify opportunities.

This project began to consider industrial organic waste in NL as a resource to be utilized instead of simply waste to be managed and disposed. The report outlined the elemental properties of different types of organic waste materials and their potential to be used as soil amendments for crops (Unc et al., 2017, p. 7). In addition to providing background information on the nutrient properties, the report overviewed potential sources of large volumes of organic waste (including profiles of organics in different industries like agriculture and forestry). Whether the catalyst or not, this work has become increasingly relevant as NL industries look to develop waste-to-value products. According to several participants, the forestry industry is looking into conducting their own research into case studies where ash and other organic materials are utilized as soil amendments.

Appendix C – Project process and timeline

March – June 2021 - Learning about the NL Context

Work in this period focused on conducting a landscape analysis of organic waste management in NL. This work highlighted the drivers and barriers to implementing better organic waste management practices in the residential, commercial, and ICI streams.

- Goals of preliminary stages of the project
    - collect information about organic waste volumes by source and organics management (and exchange) sites across the province, whether regional service board (RSB) operated, private industry, or community composting hubs;
    - discover what information is missing, open questions, and uncertainties in organics management;
    - identify overarching cross-sectoral themes and concerns; and
    - highlight current or emerging opportunities for more effective diversion, management and/or utilization of organic waste materials
- Project Scope Limitation
    - Due to its unique context and short project timeline, the project's scope did not include Labrador. This is a limitation of our work, as the recommendations were developed using interviews, surveys, and documents highlighting only the NL context. We hope that these findings/recommendations are of use to practitioners in the Labrador context, but important to note the uniqueness of the context and that there needs to be a separate project to address their context-specific issues and opportunities with organic waste management.
- NL document overview
    - Explored the policy documents and consultant reports that have shaped organic waste management in NL over the past twenty years.
    - Will integrate a shortened version of the document overview given in the interim report.
- Interviews
    - Connecting with organic waste management practitioners and stakeholders in NL significantly contributed to our understanding of the province's state of organic waste management.
    - Five central questions were integrated into each conversation, asked in similar ways;
        - What is your experience with organic waste management?
        - Do you know how much organic waste is being disposed of (in the stream they're familiar with)?
        - Are there barriers to implementing organic waste management/bio-economy enterprises in NL?
        - Are there policies from other jurisdictions or institutions that could be relevant to the NL context?
        - Do you know of any innovative approaches, incentives, or programs that assist in bio-economy development? Are you aware of any bio-economy-focused enterprises in NL?
    - “What we heard” from interviews

- Less detail than in interim report, but highlight main themes
- Through the initial round of conversations, we have identified a series of overarching themes regarding organic waste management, including:
    - The need for clear enabling policy.
    - The need to address municipal solid organics management strategy.
    - Evaluate options for organics waste management at the community and regional level.
    - The importance of partnerships in organic waste management and utilization.
    - Supports to help grow the bio-economy.
    - Need to identify cross-sectoral knowledge gaps.

- Based on findings and recommendations for future research pathways, the advisory board supported organic waste utilization and waste-to-value as a central theme for the remainder of the year.

<u>June – September 2021 – Exploring best practices in other jurisdictions</u>

We sought to learn more about organic waste utilization, waste-to-value enterprises, and regional circular bio-economies following the interim board meeting. While the first phase of research sought to understand the NL context, this phase looked outward to other contexts, looking for existing networks and best practices.

<u>September – November 2021 – Engaging with stakeholders in NL</u>

After learning more about the experiences of other jurisdictions as they work towards better practices in organic waste management and utilization, we revisited the NL context. In this round of engagement, we created a short survey to ask stakeholders across NL about their knowledge of or experience with organic waste exchange and utilization networks in their region.

In terms of geographic distribution, we saw representation from across the island of Newfoundland, with clustering in the Avalon and Humber Valley regions. There was also a diversity in professional background with 43% of respondents in the government sector, 36% from industry sector, and 21% from NGO sector. On registration data there was also a diverse age range amongst participants. This combination of diverse geographic, professional, and age backgrounds provided a holistic look at organic waste-to-value networks across the island of Newfoundland.

Using the Harris Centre's online engagement platform we designed a website housing information about the project and organic waste-to-value definitions and examples along with the shot four question survey. We asked the following

- What organic waste stream do you think holds the greatest potential to be managed or reused in ways that contributes to your region's economy? (Rank options - 1 being greatest potential)
- Do you know of any current or past initiatives seeking to manage or utilize organic waste in ways that contribute to the social or economic development of your region (e.g., community composting program, products from industrial waste, etc.)?
- What do you think are potential organic waste management/utilization ventures that would have the highest chance of success in your region?

- Who are potential partners in your region to help advance these solutions?

<u>December 2021 – February 2022 – Recommendations and discussion</u>

Considering the information collected in previous project phases, we formulated several recommendations pertaining to organic waste management and utilization in NL.

Appendix D – Interview methodology and detailed findings

Before beginning the interview process, the Harris Centre team identified the knowledge gaps we were looking to fill through the interview process. The main areas of interest identified were knowledge of organic waste generation volumes, barriers to implementing waste management/bio-economy enterprises in NL, awareness of organics management policies that may be applicable in the NL context, and innovative tools for developing an organic waste-to-value bio-economy.

As the participants were from diverse backgrounds, a structured approach wouldn't have allowed for natural conversation that focused on their relevant experiences. Therefore, based on the areas of interest, five central questions were integrated into each conversation;

- What is your experience with organics waste management?
- Do you know how much organic waste is being disposed of (in the stream they're familiar with)?
- Are there barriers to implementing organics waste management/bio-economy enterprises in NL?
- Are there policies from other jurisdictions or institutions that could be relevant to the NL context?
- Do you know of any innovative approaches, incentives, or programs that assist in bio-economy development? Are you aware of any bio-economy-focused enterprises in NL?

These questions allowed enough structure to facilitate a targeted and relevant conversation while allowing flexibility for additional topics to be integrated. Further, asking participants about the same topics allowed for the opportunity to investigate any common themes that may have emerged. After completing the first phase of interviews, it is clear that there overarching themes and emerging themes by stakeholder group.

Main themes

Through the initial round of conversations, we have identified a series of overarching themes regarding organic waste management, including:

- The need for clear enabling policy.
- The need to address municipal solid organics management strategy.
- Evaluate options for organics waste management at the community and regional level.
- The importance of partnerships in organic waste management and utilization.
- Supports to help grow the bio-economy.
- Need to identify cross-sectoral knowledge gaps.

Enabling policy

In 2019, the Government of Newfoundland and Labrador reviewed the 2002 strategy, complete with recommendations for further action. Among them was the need to investigate the development of organic waste management and partnerships with industry. However, at the time of conversation with individuals from the provincial government departments, they noted that the government had not yet examined the recommendations. They pointed out that this delay was primarily due to setbacks such as the 2020 pandemic, 2021 provincial election, and economic climate. Practitioners, particularly in the industry sector, noted the difficulty navigating organics management and exchange in the absence of

provincial environmental, regional, and industrial policies. For example, it was highlighted by industry representatives that although there were innovative opportunities to utilize forestry processing residues as soil amendments, the lack of enabling policy stunted the development of waste-to-value operations.

The general sentiment expressed by participants is that the 'inflexible' enabling policy to pursue organics waste management and exchange operations has led to a loss in opportunities and revenue. These 'outdated policies' and inflexibility were noted as hindrances to potential investments in the waste-to-value industry. An example of that was mentioned by several participants was the experience of Hi-Point industries, an aquaculture waste-to-value operation whose certification was impacted after odour concerns, leading to the downsizing/closure of that portion of the business. This experience has left industry feeling a lack of support from the government to advance innovative practices and that they have to navigate a difficult regulatory climate, interfering with their ability to grow their businesses.

Municipal Solid Organic Waste Management - Coordinated by RSBs

The 2019 waste management strategy review highlighted the support for and importance of integrating organics waste management in NL. However, as participants from all backgrounds noted, the logistics of supporting or mandating organics management have not been addressed. Participants of various backgrounds agreed that a departmental study is required to examine implementable, context-appropriate solutions for NL. As explored above, the Dillon report was the last document to survey this in-depth, but as the report was seven years ago, costs and technologies have changed. Additionally, participants from different governance bodies noted that the high price tag associated with the Dillon report hindered action in some ways, as it allocated a high cost without a phased implementation plan or options to grow the management infrastructure incrementally. Lastly, the Dillon report did not include any of the Labrador waste management regions.

As highlighted by participants, the 2019 strategy review noted the importance of collaborating with the private sector to facilitate waste management. Several industry representatives felt the report did not accurately reflect the efforts of industry to enter into waste management in the past few decades. Further, they felt the report was missing input from industry on past experiences as several participants noted industry was not consulted during the engagement process. Overall, there is a sentiment that the businesses would pursue these types of ventures willingly and without needing much (or any) program funding, there just needs to be reduction in policy barriers.

Regional and Community Management Options

Many expressed concern over the traditional landfill model as many older landfills are slated for closure, requiring new infrastructure networks. Several municipal employees noted that, if diverted, the collected organics would need to be hauled over long distances, which could require more money, time, and generate more emissions. It is for those reasons that several NGO and municipal participants noted their support for diverting the organics to waste-to-value and community composting operations. Additionally, amongst local government, academic, and NGO participants, there was a particular focus on the importance of community composting and the potential benefits that could emerge from social enterprises; such as increasing food security by providing quality compost to community gardens.

Partnerships

Another theme that arose was the need for partnerships. The proposed nature of these partnerships varied depending on the participant's background, but the concept of creating greater connectivity and knowledge sharing was a central theme. For example, individuals associated with NGOs

highlighted the importance of working with municipal organizations to educate the public on backyard and community composting techniques. Individuals from government backgrounds noted the importance of collaborating with industry to develop organics management infrastructure. Representatives from environmental and resource industries stressed the need for a network, forum, or organization to connect enterprises from different sectors. For example, it was mentioned that certain organic waste-to-value products require materials from other sectors, but it can be hard to obtain them because of disconnects between industries. There is an overarching sentiment that the lack of a solid network coordinated by an independent broker or government has impacted enterprises and may have stunted bio-economy development.

Multiple stakeholder groups noted the need for a "broker" or interface to connect entrepreneurs who could benefit from trading with each other. Many identified the necessity for partnerships from a circular economy perspective, wherein trading within the province could save significant import costs, particularly when creating and processing soil amendments. However, they are also seen as essential due to "critical mass" concerns in NL. As NL is a more sparsely populated province, there is a perception amongst participants, and by their account the business community, that the businesses cannot grow in the long term. Therefore, symbiotic and effective partnerships are essential to create a company that can expand beyond a region or singular sector.

Supports for Developing "Circular Bio-economy"

According to participants, the terms bio-economy and circular economy are just beginning to circulate in Newfoundland and Labrador. However, through conversation, it became evident that several innovative enterprises emerged over the years. Speaking firsthand with business operators allowed insight into the opportunities and challenges of starting organic-waste-to-value enterprises. From their perspective, the lack of existing networks and 'outdated' policies were among the most significant challenges. Others from government, academia, and industry associations noted a large knowledge gap in an understanding of the circular economy and accessing innovative funding programs. Several participants indicated that incentive programs exist in other jurisdictions for bio-economy ventures, but have yet to be implemented in NL. Many expressed a desire to increase understanding of the importance of a bio-economy sector and the use of circular economy methods, both for environmental and economic reasons.

Appendix E – Survey responses

Brief overview of answers from survey

Question 1: What organic waste stream do you think holds the greatest potential to be managed or reused in ways that contributes to your region's economy? (Rank options - 1 being greatest potential)

- From industry folks and interview participants, agriculture shows up frequently in the top 3, and amongst practitioners from Mfon's community composting list-serv, agriculture also appears in tandem with residential leaf and yard wastes and ICI food wastes.
- Agriculture seems to have emerged as another potential large, and essential, partner for projects related to composting. However, through conversation – formal and informal – there are perceived organizational issues within provincial departments and capacity within the federation of agriculture to represent producers.

*Question 2: Do you know of any current or past initiatives seeking to manage or utilize organic waste in ways that contribute to the social or economic development of your region (e.g., community composting program, products from industrial waste, etc.)? ***Simple list, as provided by participants*

- Backyard composting programs (supported by MMSB)
- Community composting efforts
- R&D Diversions
- City of Corner Brook looking to make connections with waste-to-value
- Island Compost
- Georgestown composting pilot project
- Battery Cage
- Lester's Farm Chalet
- Foodrescue.ca
- St. John's Farmer's Market
- 3F Waste Recovery
- Pardy's Waste Management
- Evergreen community composting
    - People can bring residential organics (food and leaf and yard wastes), currently trying to get more bins

Question 3: What do you think are potential organic waste management/utilization ventures that would have the highest chance of success in your region?

- Expand curbside pickup
- Partner with agriculture
- Fish waste
- Waste-to-fuel
- Regulatory changes to allow for bio-solid composting
- Community compost drop off centres
- Soil amendments, animal feed, etc

Question 4: Who are potential partners in your region to help advance these solutions?

- MMSB

- Government
- Harris Centre
- Regional Service boards
- R&D Diversions
- FFNL
- Georgestown community composting pilot project
- St. John's food policy council
- Industry partners

Appendix F – Success stories

Friesland, Netherlands

Since 2014, industry stakeholders have worked toward a "circular economy" in the Friesland region. In this case, a circular economy means setting up a network of partners to collaborate in exchanging organic wastes to be reused in different ways instead of being sent to landfills. The Friesland region is an agriculture-focused area with a business community that realized both the environmental importance of and business opportunities associated with developing a circular network to exchange goods, including industrial/agricultural organic wastes. This effort to establish a network was started by farmers, entrepreneurs, and local business associations, later supported by the regional government. After commissioning an initial report highlighting the opportunities and benefits of pursuing circular economy ventures, work began engaging with potential stakeholders. The only issue with this example is that the circular economy network is not operating yet (as far as one can tell online), highlighting the lengthy process of developing a circular economy network. Learn more about Circular Friesland at https://circulairfriesland.frl/en/ .

Tayside, Scotland

Based in Dundee and Perth, Scotland, the Circular Tayside initiative aimed to strengthen circular economy practices in the region. Although not entirely focused on organic waste exchange and utilization, Circular Tayside is an excellent example of a circular economy implemented in a smaller metro region, similar to St. John's Metro Region. Circular Tayside was catalyzed by several chambers of commerce and later received funding from the Scottish government and EU European Regional Development Fund. This highlights how connecting grassroots champions to governments and funding sources can help formalize and grow circular networks. The website has a wealth of information about circular economies and what is being done in their region. They developed a helpful map to highlight their partner businesses/institutions throughout the region. https://circulartayside.co.uk/circular-tayside-map/

Envirem Organics (business), New Brunswick

In the early 1990s the New Brunswick government mandated industries construct and maintain their own landfills. Once the existing landfills – which would be grandfathered into the new system – were full, they would have to develop newer, more environmentally friendly ones. The estimated cost for one of these new landfills was around $2 million. These new laws increased pressure on industries to find different ways to manage their organic waste. In 1994, Envirem Organics opened their first facility in Fredericton, NB. Envirem specializes in industrial organic waste composting. They have clients from various industries (forestry, agriculture, etc.) who truck organic waste to their facility for a low price, where it is processed and becomes Class A compost. The company charges clients a lower fee than they would pay in tipping fees at a traditional landfill. As Envirem receives the organic waste directly from processors (for example, McCain potato processing wastes), they can ensure a low contamination rate from the beginning of the process. Envirem has played a vital role in creating both an effective organic waste management system and waste-to-value operation. The company has created long-term jobs and economic opportunities for the Northern New Brunswick region. Learn more about Envirem at https://envirem.com .

Appendix G – Links to relevant provincial organic waste management documents (as identified by provincial representatives)

PROVINCE	RELEVANT DOCUMENTS	LINK TO DOCUMENT
NEWFOUNDLAND AND LABRADOR	Provincial Waste Management Strategy (2002)	https://www.gov.nl.ca/ecc/files/publications-pswms-wastemanagementstrategy-apr2002.pdf
	Provincial Waste Management Strategy Review (2019)	https://www.gov.nl.ca/ecc/files/waste-management-final-report-review-pswms.pdf
	Landfill Bans, Special Wastes and Diversion Programs (2010) – Guidance Document – Amended 2020	https://www.gov.nl.ca/ecc/files/GD-PPD-022.4-Landfill-Bans-Special-Wastes-and-Diversion-Programs-1.pdf
	Environmental Protection Act (2002)	https://www.assembly.nl.ca/legislation/sr/statutes/e14-2.htm#20_
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NOVA SCOTIA	NS Environment Act – Sec 102 – Solid Waste Management Regulations	https://novascotia.ca/just/regulations/regs/envsolid.htm
	Materials Banned from Disposal Sites	https://novascotia.ca/nse/waste/banned.asp
	Composting Facility Guidelines	https://novascotia.ca/nse/dept/docs.policy/Guidelines-Composting.Facility.pdf
	Municipal Solid Waste Landfill Guidelines	https://novascotia.ca/nse/dept/docs.policy/Guidelines-Municipal.Solid.Waste.Landfill.pdf
	Guidelines for Industrial Landfills	https://novascotia.ca/nse/dept/docs.policy/guidelines-industrial.landfill.pdf
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NEW BRUNSWICK	Waste Reduction and Diversion Plan (2001)	https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/LandWaste-TerreDechets/WasteReductionDiversion.pdf
	Guidelines for the Site Selection, Operation and Approval of Composting Facilities in New Brunswick	https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/LandWaste-TerreDechets/Composting-Compostage/GuidelinesForCompostingFacilities.pdf
	OPERATIONAL PRACTICE FOR THE EVALUATION OF C&D DEBRIS DISPOSAL SITE APPLICATIONS	https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/LandWaste-TerreDechets/C_D_Ops_Practice_EN.pdf
	Clean Environment Act – Regional Solid Waste Commissions Act	http://laws.gnb.ca/en/ShowPdf/cr/96-11.pdf
	History of Organic Waste Management in NB (From Fundy Recycles)	https://www.fundyrecycles.com/assets/Uploads/History-Solid-Waste-in-New-Brunswick.pdf
PROVINCE	**RELEVANT DOCUMENTS**	**LINK TO DOCUMENT(S)**
PRINCE EDWARD ISLAND	Waste Management Resource Regulations	https://www.princeedwardisland.ca/sites/default/files/legislation/e09-15-environmental_protection_act_waste_resource_management_regulations.pdf
	Environmental Protection Act	https://www.princeedwardisland.ca/sites/default/files/legislation/e-09-environmental_protection_act.pdf
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ONTARIO	Food and Organic Waste Policy Statement	https://files.ontario.ca/food_and_organic_waste_policy_statement.pdf https://www.torontoenvironment.org/ontario_food_organic_waste_framework
	Proposal to Amend Food and Organic Waste Policy Statement	https://ero.ontario.ca/notice/019-2498
	EPA – Landfilling Sites	https://www.ontario.ca/laws/regulation/980232

	EPA – Waste Audit and Waste Reduction Work Plans	https://www.ontario.ca/laws/regulation/940102
	EPA – Recycling and Composting of Organic Waste	https://www.ontario.ca/laws/regulation/940101
	EPA – General Waste Management	https://www.ontario.ca/laws/regulation/900347
PROVINCE	**RELEVANT DOCUMENTS**	**LINK TO DOCUMENT(S)**
SASKATCHEWAN	The Environmental management and Protection (General) Regulations - Section 9(1)	https://www.saskatchewan.ca/business/environmental-protection-and-sustainability/environmental-code
	The Municipal Refuse Management Regulation	https://publications.saskatchewan.ca/api/v1/products/672/formats/984/download
	Solid Waste Management Strategy (2020)	https://www.saskatchewan.ca/-/media/news-release-backgrounders/2020/jan/solid-waste-management-strategy---2020.pdf
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BRITISH COLUMBIA	Organic Matter Recycling Regulation (currently under review)	https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/18_2002
	Organic Matter Recycling and Regulation	https://www2.gov.bc.ca/gov/content/environment/waste-management/food-and-organic-waste/regulations-guidelines
	Waste Management Act	https://www.bclaws.gov.bc.ca/civix/document/id/consol2/consol2/96482_01
	Code of Practice for Agricultural Environmental Management	https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/8_2019
	CleanBC Plan – includes targets for organic waste	https://cleanbc.gov.bc.ca/ https://blog.gov.bc.ca/app/uploads/sites/436/2019/02/CleanBC_Full_Report_Updated_Mar2019.pdf
	Organics Infrastructure Program – increase organic	https://www2.gov.bc.ca/gov/content/environment/waste-management/food-and-organic-

	waste processing capacity in the province	waste/organic-waste-diversion/organics-infrastructure-program
	CleanBC Organic infrastructure and collection program	https://www2.gov.bc.ca/gov/content/environment/waste-management/food-and-organic-waste/organic-waste-diversion/cleanbc-organic-infrastructure-and-collection-program
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YUKON	Environment Act – includes Solid Waste Regulations	https://laws.yukon.ca/cms/images/LEGISLATION/PRINCIPAL/2002/2002-0076/2002-0076.pdf
	Requirements for Public Waste Disposal Facilities	https://yukon.ca/sites/yukon.ca/files/env-requirements-for-public-waste-disposal-facilities.pdf
	*Majority of regulation found in City of Whitehorse	

Appendix H – Notable champions in organic waste management and utilization in the province

PROVINCE	REGION/STAKEHOLDER	LINK TO INFO
NEWFOUNDLAND AND LABRADOR	MMSB	https://mmsb.nl.ca/funding-programs/backyard-compost-bin-distribution-program/
	Food First NL	https://www.foodfirstnl.ca/
	Western Environmental Centre	https://www.wecnl.ca/
	City of St. John's	http://curbitstjohns.ca/recycle/backyard-composting/
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NOVA SCOTIA	Halifax Regional Municipality	https://www.halifax.ca/home-property/garbage-recycling-green-cart/green-carts-leaf-yard-material/new-organics-facility
	Valley Waste Resource Management	https://www.vwrm.com/education-outreach/circular-economy/
	Pictou County Solid Waste	https://www.pcwastemgmt.com/
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NEW BRUNSWICK	City of Saint John (Fundy Region)	https://www.fundyrecycles.com/solid-waste/garbage-recycling/composting/ https://saintjohn.ca/en/waste-and-recycling
	Envirem	https://envirem.com/
	Moncton	https://www.moncton.ca/waste-collection
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PRINCE EDWARD ISLAND	Island Waste Management Corporation	https://iwmc.pe.ca/
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ONTARIO	Toronto	https://www.toronto.ca/services-payments/recycling-organics-garbage/
	Peel Region	https://www.peelregion.ca/waste/organics
	Durham	https://durhamorganics.ca/
	Commercial Malls - Walker Environmental and Cadillac Fairview	
	Guelph Region	https://guelph.ca/plans-and-strategies/solid-waste-management-master-plan/
	Second Harvest, Food for Life, Plentiful Harvest	https://secondharvest.ca/ https://foodforlife.ca/ https://www.uhc.ca/plentiful-harvest-food-rescue/
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SASKATCHEWAN	Saskatchewan Waste Reduction Council	https://www.saskwastereduction.ca/recycle/resources/composting/large-scale-composting/
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BRITISH COLUMBIA	Regional District of Nanaimo	https://www.rdn.bc.ca/sites/default/files/inline-files/RDN%20Organics%20Diversion%20Strategy%20Summary%20Report%202000-2020.pdf

	City of Surrey	https://www.surrey.ca/services-payments/waste-collection/surrey-biofuel-facility
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YUKON	City of Whitehorse	https://www.whitehorse.ca/departments/environmental-sustainability/waste-diversion/additional-information/organics