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RESEARCH & INNOVATION CENTRE




Building the foundation for a Canadian upcycled food network: Final Report

March, 2026

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1. Background

1.1. Introduction to upcycling

Upcycling is emerging as a transformative concept in the food industry, addressing global challenges such as food waste, supply chain security, and sustainability. In 2020, the Upcycled Food Association (UFA) introduced a clear definition of upcycled food to guide policymakers and businesses. Their definition emphasizes the use of ingredients that would otherwise not be consumed by humans, a verifiable supply chain, and positive environmental impacts.

The global upcycled food products market is valued at USD 66.8 billion in 2025 and is projected to grow at a 6.5% CAGR to USD 125.39 billion by 2035 (OpenPR, 2026), driven by rising demand for sustainable consumption and advances in food processing technologies.

1.2. Network & Project objectives

Vineland Research and Innovation Centre (Vineland) received funding from the CIFST Food Cluster and the Ontario Ministry and Agriculture, Food and Agribusiness (OMAFA) Ontario Agri-Food Innovation Alliance to support knowledge translation and transfer within the local food upcycling industry. As part of this effort, Vineland investigated the possibility of developing a food upcycling research network.

Network objective: Improve communication and knowledge exchange in the food upcycling industry to support its growth and economic success. Food upcycling includes valorization of food by-products or co-products into new food ingredients, foods, cosmetics, agricultural inputs or other valuable products.

Vineland project objectives: The current project aimed to investigate the challenges and needs of the burgeoning upcycled food industry in Canada to inform the development of an upcycled food research network. Several key questions to be addressed include:

- What types of entities should be prioritized for participation in an upcycled food research network?
- What types of activities are needed from an upcycled food research network to support the development of the sector?
- What types of research network models should be considered?

These questions will be addressed in the ensuing sections of the report.

2. Who should participate in an upcycled food research network?

2.1. By-product generators in Canada

Food waste is a significant issue along the entire food supply chain, with certain sectors contributing disproportionately to the total volume of food waste.

At the national level, the highest annual volume of food waste occurs in field crops and produce (Second Harvest, 2024). Of this waste, over 70% occurs before reaching retail indicating that engagement from growers and processors is critical to achieve a meaningful reduction in food waste.

The case of the produce sector is particularly interesting considering its substantially smaller size compared with field crops. For example, at the production level, field crops had the largest market size among Canadian agriculture sectors with $40.0 billion in farm revenue (farm market receipts) from 65,135 farms in 2023, whereas horticulture production was estimated at approximately one quarter of the size with $8.6 billion in farm revenue from 17,433 farms (AAFC, 2023). Within the horticulture sector, two areas with particular opportunity for upcycling include the greenhouse vegetable sector and the fruit and vegetable processing industry where there is still a significant reliance on landfilling (Grygorczyk & Blake, 2022).

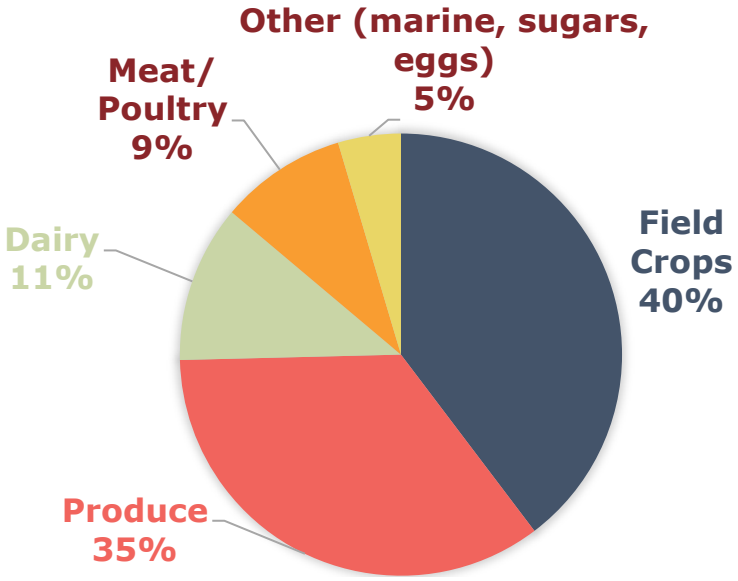


Figure 1. Percent of food waste in the Canadian food supply chain by sector. Source: Second Harvest, 2024.

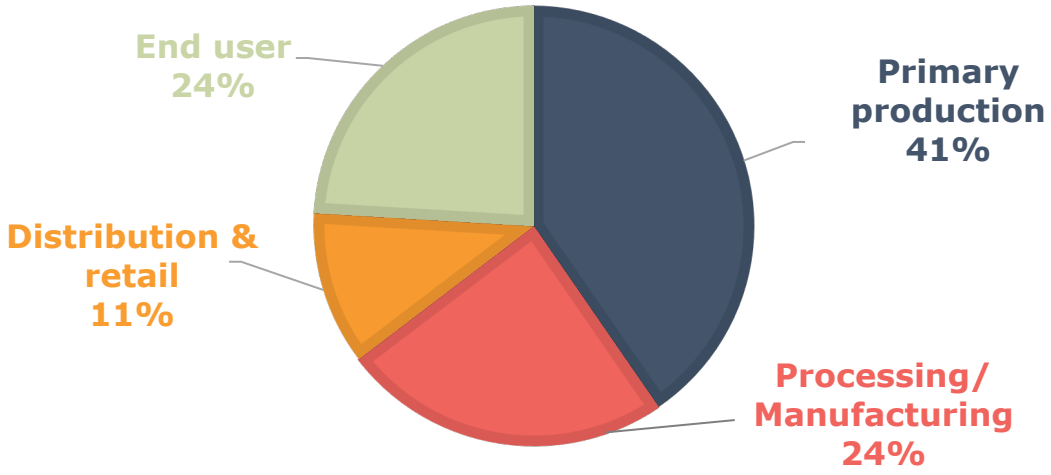


Figure 2. Percent of food waste in the Canadian food sector by stage in the supply chain. Note: End user includes households, hotels, restaurants and institutions. Source: Second Harvest, 2024.

Thus, an upcycled food research network should emphasize participation from plant-based product value chains (field crops and produce) with engagement from primary producers and processors.

2.2. Upcycled food manufacturers

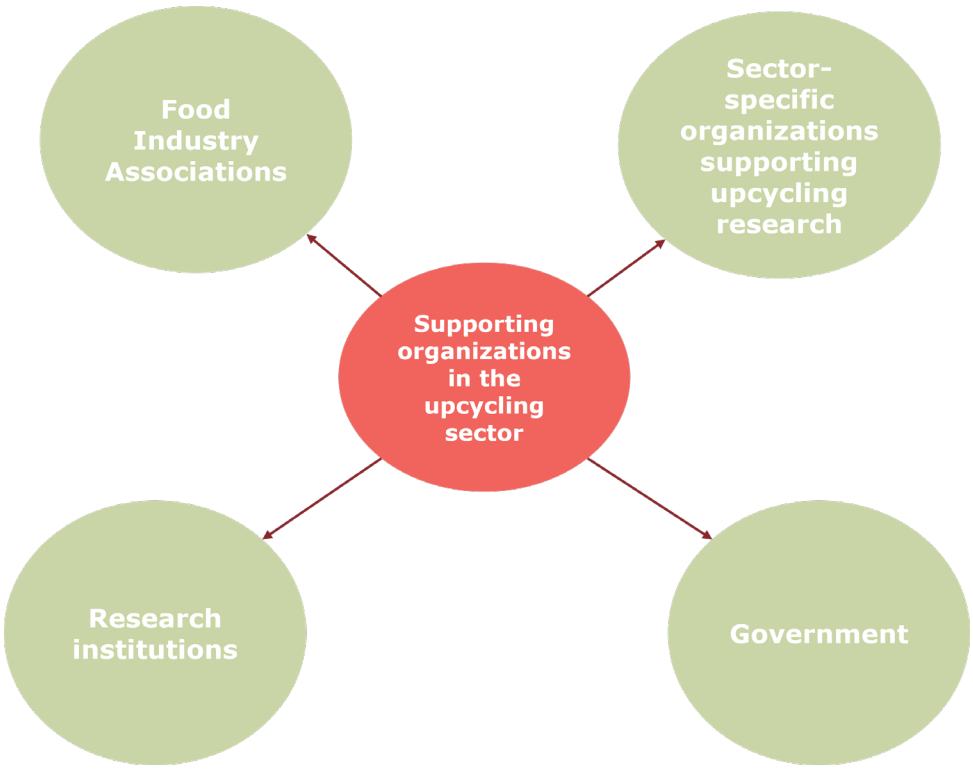
Upcycled products were most prominently launched in the snacks and bakery categories, which accounted for nearly half of all such products. Additionally, soft drinks represented 16% of upcycled product launches, further highlighting the diverse range of applications within the market (Foodvalley, 2024).

While some companies incorporate by-products directly into new products such as spent grains or juice pulp into baked goods or ready-to-eat meals, others rely on sourcing upcycled ingredients to incorporate into finished products. Several SMEs in Canada have introduced upcycled food ingredients that provide a range of functionalities including shelf-life extension, texturizing, flavour enhancement or source of prebiotic fiber.

As upcycling continues to gain momentum, expanding industry representation will be crucial in driving innovation and market growth.

A research network should include representation from the fruit/vegetable, spent grain and legume upcycling sectors, especially companies that support the development of snacks, baked goods and upcycled beverages, as these sectors have thus far had the greatest success introducing upcycled products to the market.

2.3. Supporting organizations that may engage in a Canadian food upcycling research network



3. Upcycling sector challenges and needs

Interviews were conducted with 18 companies within the upcycled food production value chain to better understand their motivators, challenges, research needs and opportunities. Companies interviewed are characterized in the table below:

Table 1. Interview participant characteristics

Interview participant category	
By-product generator	39%
Upcycled ingredient company	56%
Upcycled food CPG	22%
Food rescue	11%
Company size	
Small (<10 employees)	61%
Medium (10-499 employees)	28%
Large (500+ employees)	11%

*Participant category values add up to more than 100% as some fit into multiple categories.

Key themes from the interviews are summarized below.

3.1. Common challenges

Sourcing and supply chain constraints

- Difficulty accessing a steady and consistent supply of by-products or upcycled ingredients.
    - Supply is often inconsistent or unreliable, disrupting production and planning.
    - Mismatch in scale between suppliers and customers.
    - Customers prefer multiple supplier options to be available to reduce supply risk, but few players exist.
- Some by-product generators lack incentive to participate, as disposal is cost-neutral and change requires effort and investment.
- In large corporations, complex decision-making structures hinder rapid adoption, scaling of partnerships or making by-product available to upcyclers.

Processing challenges

- Lack of access to specialized processing equipment (e.g., for dehydration, pulverization, milling).
    - Lack of contract processors at the appropriate scale or with specialized capabilities.
    - High capital investment required for in-house equipment. May not be justified by initial customer demand or ROI.
- Processing must be completed quickly and is expensive.
    - Short shelf life of by-products adds pressure to distribute and stabilize quickly.
    - High energy costs of dehydration and freezing.

Market demand, integration, and buyer hesitation

- Upcyclers have difficulty identifying an attractive value proposition or application for their new products.
- Customers are hesitant to change established routines:
    - Integration of upcycled ingredients requires production adjustments and process changes.
    - Lack of clear technical guidance on how and why to use these new ingredients in food applications.
- Strong competition from conventional markets:
    - Upcycled products often face pricing pressure from lower-cost conventional or imported ingredients.
    - Raw materials are also in demand from the animal feed industry, making by-product sourcing more competitive and expensive.

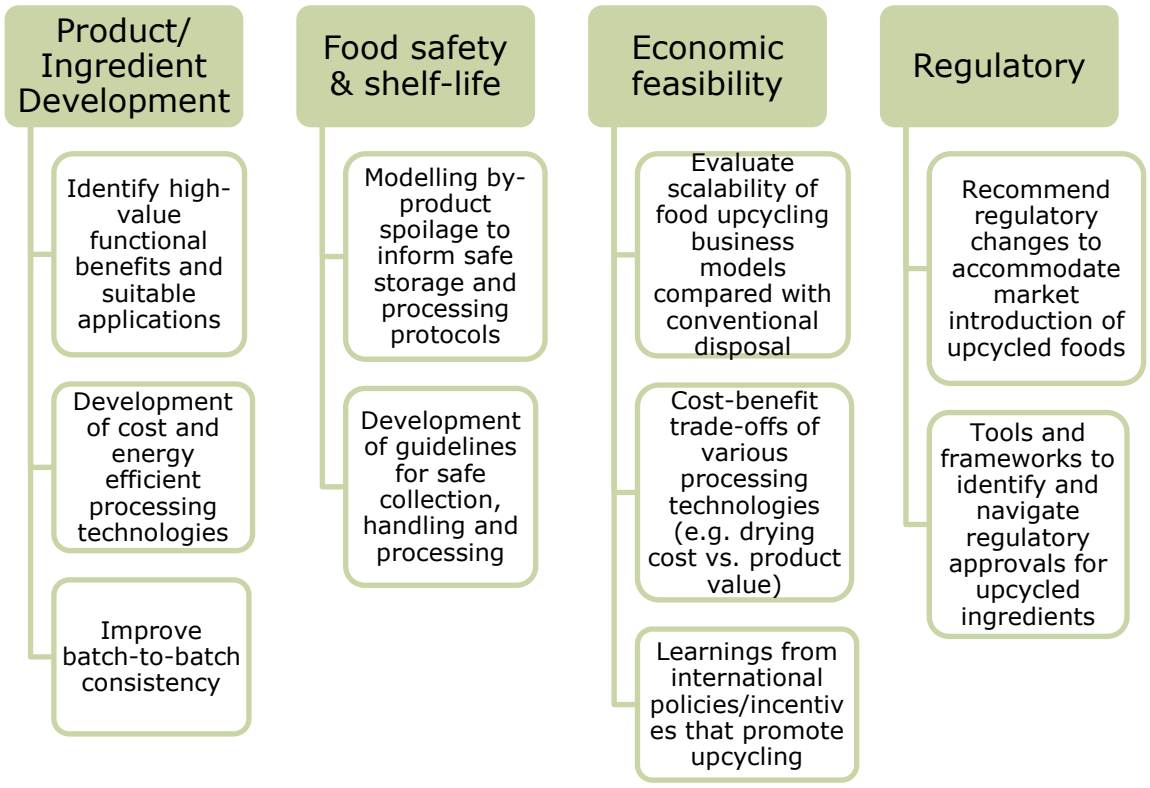
Regulatory, policy, and safety barriers

- Regulatory approvals are difficult to obtain because it’s unclear where or if many upcycled ingredients fit in established categories.
- Food safety uncertainties:
    - No clear guidelines on safe handling or storage timelines (e.g., how long pomace can be stored before processing).
- Waste governance fragmentation

- Inconsistent organic waste or by-product separation rules across provinces and municipalities in Canada makes by-product access difficult in regions where organic by-product separation is not required or incentivized.
- Lack of consistency and transparency in landfill tipping fees across regions makes it difficult to develop scalable, regionally adaptable business or pricing models for upcycling initiatives.

3.2. Research and support needs

Research needs



Policy & regulatory needs

- Advocate for harmonized waste separation policies across provinces.
- Clear guidelines for where upcycled ingredients and/or by-products fit within regulatory frameworks (food safety, labelling).
- Guidelines for maintaining food safety in by-product handling.

Collaboration & supply chain network needs

- Access to resources:
  - Available processing facilities.
  - Sources of by-products or dehydrated/frozen products.
- Improve traceability and visibility of available by-product streams.
- Opportunities to meet other organizations in the upcycling value chain.
- Increased knowledge sharing from the scientific community to the upcycled industry. For example, regarding research findings on public perception, trust, and understanding of upcycled food products.

Market access

- More funding support needed for the commercialization phase:
  - Marketing and market research.
  - Access to affordable processing/production infrastructure.

3.3. Success factors: what makes some upcycled food companies more successful than others.

- Actively create demand
  - Effective marketing
  - Integrate customer education in their branding
  - Proactive business development & sales
- Establish strong supply chain relationships
  - Collaboration: E.g. Create hubs to work with other organizations that streamline transport, etc.
- Establish on-site processing of by-products to minimize transport costs and time
- Access financial support to reduce barriers to entry and scale

4. Proposed network activities

4.1. Networking and knowledge translation opportunities

- Helping members build new supply chains by:
  - Hosting networking events.
  - Making personalized connections as opportunities arise.
  - Hosting an online marketplace for sources of by-product or dehydrated/frozen upcycled ingredients.
  - Hosting a searchable online resource listing processing facilities with their capabilities and available capacity.
- Knowledge Translation and Transfer (KTT): Hosting both virtual and in-person events where industry can access the latest research findings from research institutions as well as practical guidance from experienced professionals.
- Voice of the upcycling industry regarding government policy development needed to support the growth of the sector.

4.2. Market access

Support is needed in the commercialization phase for:

- Market research, consumer testing, application development.
- Marketing, promotion, and consumer/retailer education.
- Access to affordable processing/production infrastructure, especially for scale-up.

4.3. Research hub

The network would facilitate the development of research consortia to answer commonly cited research needs as described in the section entitled **Research needs**.

5. What are some relevant network models for structuring a collaborative research network in the upcycling space?

Collaborative research models provide structured frameworks to align interests, share knowledge, and drive innovation in the upcycling sector. Below, we describe two network models that were identified in academic literature which were deemed the most relevant to the upcycling industry.

Table 2. The key difference between Hub-and-Spoke models and Consortium models

Criteria	Hub-and-Spoke Models	Consortium Models
Primary goal	1. Resource distribution 2. Service delivery 3. Knowledge transfer for innovation	Address a common set of research questions relating to industry-specific challenges and focus on practical applications.
Structure and organization	Centralized (A central organization coordinates) Coordination activities can be structured (contracts and formal agreements to clarify IP and financial commitments; scheduled regular meetings/workshops to align research direction; long-term strategic planning with partners) or unstructured (sporadic meetings and informal exchanges)	De-centralized, more collaboration based: A joint steering committee of researchers and practitioners commonly define research objectives, assess progress of work, and evaluate project results. However, all consortium members may interact with each other directly and contribute to research.
Stakeholder roles	The hub, which may be a research institution or other organization, helps to match spokes with industry needs. Research organizations in the spokes, remain independent. Instead of directly engaging with multiple research organizations separately, industry organizations go through the hub to find the most suitable research partner. The hub may also pool research resources (e.g., lab facilities, expertise, funding opportunities)	Industry drives the agenda by defining practical research needs. Industry partners also test research findings in real-world business settings. Researchers contribute through knowledge creation.

	and make them available to industry.	
Major sources of funding	Government grants typically fund the establishment and operation of the hub organization. Industry partners match this funding by paying membership fees or making in-kind contributions (e.g., equipment, research data, personnel). These membership fees grant companies access to research, networking opportunities, and early insights into emerging technologies. In some cases, additional government grants may also subsidize individual research projects among the "spoke" research organizations and industry partners.	Funding is shared between industry and academia, ensuring financial sustainability. Companies pool funds, for example through consortium membership fees, to pay for research. Sometimes the funding is supplemented by public grants.
Case study example	Canadian Food Innovation Network; Strategic Pathways to a Hub-and-Spoke Food Hub in Vancouver	Vineland Greening the Landscape Consortium Note that Protein Industries Canada (PIC) can be considered a hybrid model of hub-and-spoke with PIC being the hub each spoke being a consortium of their members engaging in various research projects.

6. Research into Action: Next steps

6.1 Networking Event

On June 18, 2025, Vineland Research and Innovation Centre hosted a Food Upcycling Networking Event in Mississauga, ON, bringing together over 70 participants from across the upcycling ecosystem. Attendees included by-product generators, ingredient manufacturers, researchers, government representatives, and industry leaders, all interested in advancing innovation and collaboration in the Canadian upcycled food sector (Figure 1).

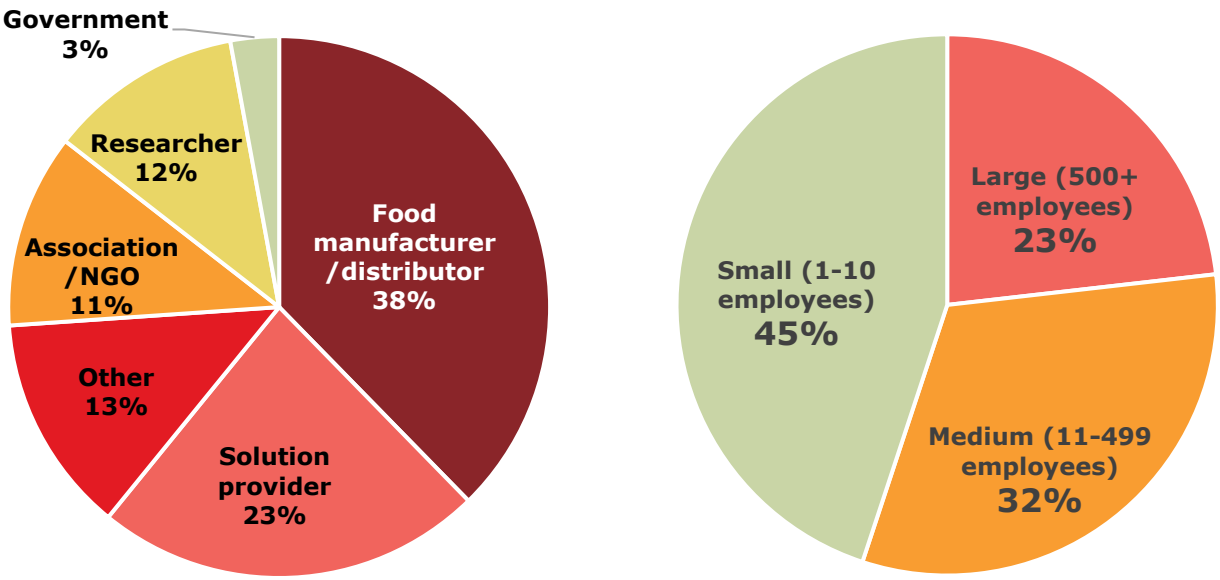


Figure 1. Participant breakdown of the 2025 Food Upcycling Networking Event

The event was designed to share preliminary insights from Vineland's upcycling network research and gather feedback from stakeholders. Input collected during the meeting helped to inform the development of a Canadian upcycled food network, aimed at supporting upcycling initiatives in Canada.

2. Scenes from the June Networking event

Event Highlights

Keynote

The keynote address was delivered by Dr. Lara Ramdin, representing the Upcycled Food Association and Foundation. Dr. Ramdin is an upcycled food expert with leadership experience at major global food and consumer companies and her presentation along with the post-keynote discussion, highlighted several critical challenges facing the growth of upcycled foods in Canada.

3. Dr Lara Ramdin delivering the keynote address

A central theme was the lack of research on how Canadian consumers perceive upcycled foods and how these products should be positioned in the market. Without stronger consumer insights, companies face difficulty developing effective messaging and product strategies. This gap also affects commercialization: without consumer demand, retailers are hesitant to carry upcycled products, and without retail adoption, scaling becomes extremely difficult.

Dr. Ramdin emphasized that storytelling, consumer education, and clear value propositions will be essential for building interest and demand.

Panel Discussion

A panel discussion featuring Douglas Alexander (Belmont Food Group), Ricardo Martinez (Terra Bioindustries), Dr. Lara Ramdin (Upcycled Food Association and Foundation), and Stephen Lukawski (Fruit D'Or) explored the key challenges facing the upcycling sector and discussed potential pathways forward. Panelists emphasized the importance of collaboration across the value chain to accelerate the growth of upcycled foods in Canada.

4. Panel Discussion (Left to Right: Douglas Alexander, Ricardo Martinez, Dr. Lara Ramdin, Stephen Lukawski)

Key pillars of support identified during the discussion included:

- Driving consumer adoption and engaging retailers
- Strengthening supply chain reliability
- Bridging commercialization and applied research
- Addressing regulatory and food safety considerations

Industry Blitz Presentations
A highlight of the event was a series of rapid "Blitz" presentations, where 35 companies delivered concise 90-second overviews of their businesses and types of connections they are seeking in the upcycled space. These presentations showcased innovative products, technologies, and ingredients from across the upcycling sector, while also highlighting opportunities for collaboration throughout the value chain.

6.2 Event Feedback and Follow-Up

Informal feedback following the event was positive. Vineland received approximately 15 follow-up emails, strong social media engagement, and 50 attendees confirmed interest in receiving future communications about the initiative after the meeting.

Post-Event Survey
Approximately six months after the event, attendees were invited to complete a short follow-up survey (5–10 minutes) to better understand the impacts of the networking meeting and inform next steps. The survey asked participants to share whether the event led to new connections, collaborations, or other outcomes, and also gathered input on what participants would like to see from a future Canadian upcycled food network, including priorities, potential activities, and areas of support.

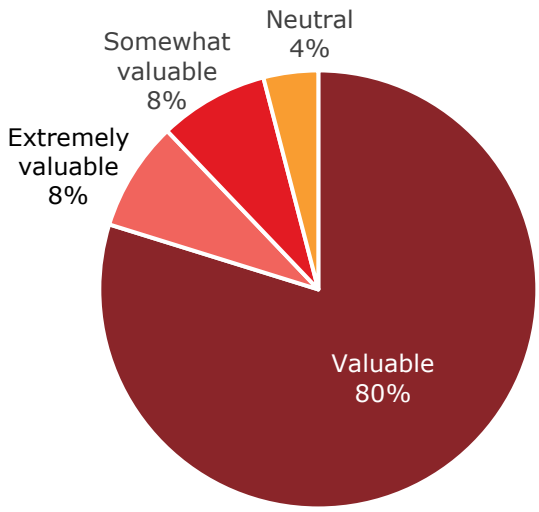


Figure 5. Survey participant responses to the question "How valuable did you find the event overall?"

Demographics
Twenty-five participants (45% of non-Vineland event attendees) completed the survey, and the composition of respondents closely mirrored the breakdown of organizations that attended the event, providing a representative snapshot of the overall group.

Survey results indicated that participants found the event highly valuable (Figure 5). Notably, no respondents indicated that the event was not valuable, suggesting that the meeting successfully provided meaningful connections and insights for participants.

Event Impact

The event had a clear impact on attendees' professional networks, with all respondents reporting at least one outcome from the event (Figure 6). Among those who gained new professional contacts, 83% reported having follow-up discussions with 1–3 new contacts, while 17% reported follow-up discussions with 4–6 new contacts, indicating that many of the connections formed at the event led to continued engagement and potential collaboration.

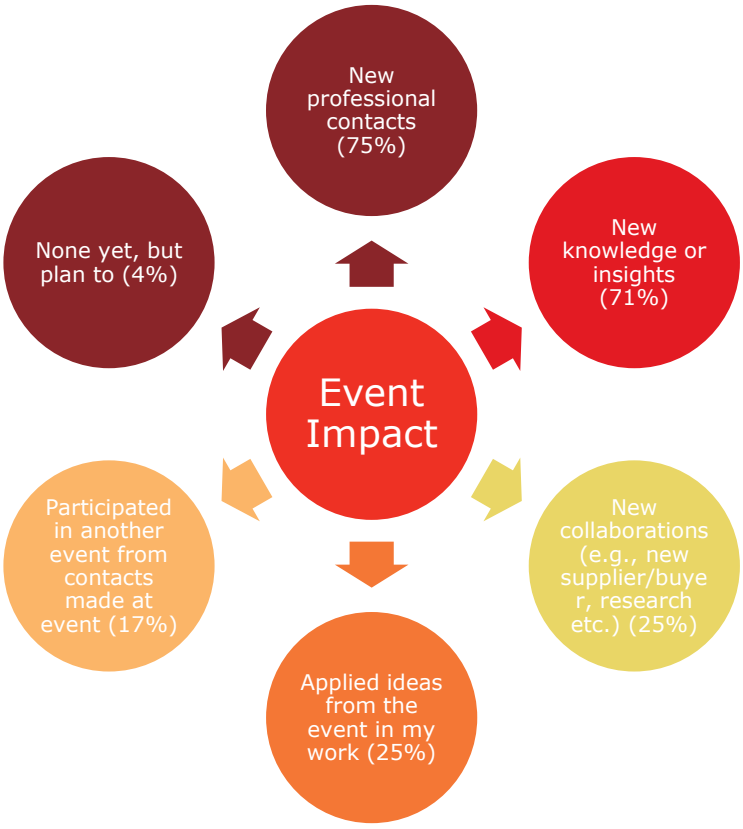


Figure 6. Graphic displaying participant outcomes from participating in the 2025 Food Upcycling Event

To better understand what participants would like to see from a future Canadian upcycled food network, respondents were asked to rank potential network priorities. A cluster analysis was conducted to identify patterns in these rankings, grouping participants based on similarities in their responses. Two distinct groups emerged (Table 3).

Group 1 placed the highest priority on research and development (R&D), followed by collaboration and access to funding.
Group 2, in contrast, ranked collaboration and market development as their top priorities.

Table 3. Results of the cluster analysis on upcycling network priorities

	Group 1	Group 2
Priorities	• R&D • Collaboration | Funding	Collaboration | Market development
Group Profile	Dominated by: By-product generators & Industry associations, R&D centres	Dominated by: Ingredient companies, R&D centres

To understand what might explain these differences, we examined the types of organizations represented in each group. Group 1 was largely composed of by-product generators, R&D centres, and industry associations, which aligns with their stronger focus on research and technical development. Group 2 included more ingredient companies, alongside some R&D centres, which is likely to explain the greater emphasis on collaboration and market growth.

Organization size was evenly represented across both groups, indicating that these differences in priorities were driven more by organizational role within the value chain than by company scale.

6.3 Next Steps

We are excited to share that as a result of this project, Vineland is now working with Upcycled Food Association (UFA) to support them in establishing a Canadian hub of their organization to continue the upcycling community-building across Canada.

UFA will soon be launching a call for Canadian upcycling community members interested in participating in this initiative. Join the UFA mailing list to receive newsletters with hub updates: https://www.upcycledfood.org/contact-us

For more information contact:

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Acknowledgements

This research and networking event was funded by the Ontario Agri-Food Innovation Alliance, a collaboration between the Government of Ontario and the University of Guelph, as well as by Agriculture and Agri-Food Canada through the CIFST Canadian Food Cluster. Vineland is funded in part by the Sustainable Canadian Agricultural Partnership (Sustainable CAP), a five-year, federal–provincial–territorial initiative, Vineland operates on property and in buildings owned by Agricultural Research and Innovation Ontario (ARIO), an agency of the Government of Ontario.

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