FEEDING THE FUTURE WITH CANADIAN TECHNOLOGY

Methodology

> *This report aims to evaluate the current state of Canada's agriculture and food system, along with the broader innovation ecosystem, to identify its strengths and the opportunities for sustainable innovation. The goal is to advance the sector, help Canada meet its climate commitments, contribute to global solutions, and bolster the national economy.*

APPROACH

Our research approach rested on a foundation of community-based participatory research; an iterative process that facilitates partnerships, promotes co-learning and empowerment, and produces value for all parties through engagement and knowledge dissemination (Israel et al., 1998).

Our approach was underpinned by Design Thinking - an innovation process that focuses on clearly identifying the root cause of problems in complex systems and uses iterative non-linear approaches to developing solutions. Often called human-centered design, Design Thinking focuses on the people experiencing the challenges at hand and therefore requires researchers to have a mindset consisting of empathy, curiosity, comfort with ambiguity, optimism, experimentation, and a bias towards action and trialling solutions with prototypes (IDEO, 2011). Our consultations were also guided by the principles of the UN Food Systems Summit Dialogues (2021). Key to these dialogues were structured conversations, a diversity of participants and effective discussion leaders, in order to create a trusted space and ensure respect among participants (United Nations, 2024).

Community-based participatory research, together with Design Thinking methods, informed an inclusive approach that facilitated partnerships and deep collaboration throughout the process (Minkler, 2005., Brown 2009). We chose this approach due to the interconnected and specialized nature of the agri-food community in Canada, and the need to promote a collaborative network of 'science-policy-social interfaces' to foster engagement, transparency, and accountability (Singh et al., 2023). Ultimately, this approach allowed us to collect diverse perspectives, resources, and skills that contributed to an overarching message to share with broader audiences (Lasker et al., 2001).

One of our core principles was fostering accessibility and inclusion to ensure a broad range of voices engaged in the Canadian agri-food ecosystem were heard. To be inclusive in our research approach, we not only recruited diverse voices, but we made efforts to ensure they felt that they belonged at the table (Mor Barak, 2015). Our team considered approaches to mitigate exclusion during each phase, including varying the meeting format (e.g., virtual, in person), and considering potential barriers to participation (e.g., religious holidays, childcare needs, financial cost of engagement). Overall, our team was committed to leading interviews with curiosity and respect.

> *Each participant had something unique to contribute, and each contribution added value to this process, which we called the "ag-tech dialogue" project.*

PHASES OF DEVELOPMENT

The development of this report included four distinct phases: 1) Discovery; 2) Testing Ideas & Research; 3) Validation; and 4) Ongoing Conversation.

Phase One: Discovery

The proverb "leave no stone unturned" served as a prompt for the project's *Discovery* phase. Our intention was to investigate existing knowledge without any constraints or hierarchy. We started with several broad research questions:

- *What is the current state of agriculture and food production in Canada?*
- *Who are the stakeholders involved?*
- *How does this connect to global food systems?*
- *Where are there opportunities for improvement towards sustainable agriculture?*
- *Where are there barriers towards sustainable agriculture?*
- *What is the unique opportunity for technology in this advancement?*

We then established a research team consisting of faculty, professional staff, and graduate students. We also established an advisory committee that consisted of agriculture and food leaders across Canada, representing academia, industry, government, investors, entrepreneurs, and producer communities. The advisory committee served as a "network of networks," helping us to include a wide range of voices and foster actionable results (Singh et al., 2023). After onboarding, this advisory committee also provided us with connections to their networks. These connections led to scientific, economic, and business insights on relevant topics, and helped us monitor current trends in the national conversation on ag-tech in Canada.

A literature review was conducted, drawing on leading knowledge from academic literature and industry reports to gain a holistic overview of the Canadian ag-tech ecosystem as well as global insights. Given that ag-tech is such a broad topic, the exploratory nature of the initial scan ensured we highlighted all relevant key strategies for Canadian ag-tech to excel globally.

Findings from the literature review served as a foundation for us as we started to interview representatives of industry, academia, government and agricultural organizations across Canada. Initial interviews were conducted by the advisory committee, and additional participants were invited using a snowball sampling method. As enthusiasm for the project and referrals from participants grew, a number of highly qualified personnel were added to the interview cohort. In the end, we conducted over 100 one-on-one interviews, which included questions on broad, visionary topics such as:

- *What opportunities does Canada have in the development of sustainable ag-tech?*
- *What barriers does Canada have?*
- *How do we define ag-tech?*

We conducted in-person, semi-structured roundtable discussions, targeting specific stakeholder groups. We also held smaller-group discussions and less formal conversations. We were intentional about ensuring younger generations were heard in the consultations and reflected in the report. To supplement these discussions, we gathered observational information by attending over a dozen events across Canada, including conferences, panel discussions, and roundtables. These events were chosen for their strategic alignment with the goals of this report, and allowed members of the research team to engage in relevant conversations and bring regional, national, and global insights back to the discovery process. The research team also benefited from involvement in other projects relating to sustainability and agricultural technology, some of which also included stakeholder consultations. Notes and transcripts from interviews, roundtables, and additional events were gathered and analyzed to pull out key themes.

To expand our reach further, the team created an online portal for feedback, gathering responses to a short set of questions that reflected those in the one-on-one interviews.

In designing the wide-ranging consultations, we were inspired by the convener roles used so effectively in the UN Food Systems Summit Dialogues (2021). More recently, the World Vision/4SD Foundation Nutrition Dialogues (2024) followed a similar format. In these initiatives, the convener role was found to have long-lasting benefits in the ability to continue conversations and mobilization beyond the initial dialogues and in providing continuity even through changes in governments (Kalibata et al., 2024).

Phase Two: Testing Ideas and Research

The initial *Discovery* phase focused on gathering information from surveys, interviews, roundtables, and relevant literature, which we then cross-referenced in the *Testing Ideas & Research Phase*. This approach was invaluable, allowing core insights to shape the report during its development, and facilitating the implementation of new strategies to ensure the report's practical benefits

The research team compiled the insights from the initial literature review, interviews, round table discussions, online portal, and observational information to draft an interim report, released in November 2023, that summarized what we heard in the *Discovery* phase. The report was released publicly on a website and our online feedback portal was adjusted to enable interested stakeholders to leave feedback on the interim report.

In an effort to include industry knowledge and promote collaboration, we also shared our interim report with leaders of organizations within the Canadian ag-tech ecosystem, including our advisory committee, for review and feedback with the intention of validating ideas and solidifying our recommendations. We held small group sessions with advisory team members to discuss areas of the report that aligned with their expertise, diving deeply into the topics to fill in gaps, and strategizing how we could strengthen the recommendations.

Drawing on this feedback, our team utilized the key themes identified in the interim report to build out business cases and recommendations for the final report.

Phase Three: Validation

In the *Validation* phase, the research team examined national and international data and analyses to test the findings from the stakeholder consultations and feedback processes. Often, sector-specific perspectives can be informed—or misinformed—by beliefs and interpretations that cannot be validated. By ensuring that the challenges, opportunities, and actions proposed in the report were supported by data, we were able to further refine the recommendations within the report.

To continue the iterative process of refining the recommendations, a draft of the final report was shared with several dozen stakeholders in Canadian agri-food for feedback. This feedback generated additional insights and perspectives to inform the final report.

The design of this project allowed the research team to achieve a diverse and non-biased scan of the agri-food system and wider innovation ecosystem, while allowing the interconnectedness of the sector to inform the dialogue and the findings. Thus, rather than gathering discrete insights from the myriad interests within Canada's agri-food system, this process facilitated multiple viewpoints and interests to converge into recommendations aimed at advancing the sector as a whole.

The entirety of this process led to the development of our final report, released in September 2024, along with associated case studies, policy briefs and infographics. Accessible writing and visual representation of our work was important to ensuring a strong knowledge mobilization strategy for the end products.

Phase Four: Ongoing Conversation

This report is part of a continuous engagement process . Our team is committed to ongoing conversation and feedback as we recognize the dynamic evolution of Canadian ag-tech and strategize what we can do as key actors in the innovation ecosystem to support sustainable development in agri-food. This aligns with our commitment to participatory research, which emphasizes the importance of feedback, social learning, and sharing insights (Stringer et al., 2006). From the experience of the Food Systems Dialogues, we recognize the positive impact of having a wide range of stakeholders and changemakers included in the conversation. We are also committed to the principles of providing a welcoming and safe space for a diversity of voices.

The primary audience for this report includes government, academia, investors, producers, incubators and accelerators, and all other innovation ecosystem partners. As we move forward, we invite representatives from each audience group to generate discussion and engage with us and with each other to advance Canadian ag-tech.

> *We are hopeful that the collaborative, convening role initiated through this project will inform an ongoing process of dialogue and action to help Canada become a world leader in sustainable ag-tech innovation.*

For more information, check out the final report:

Feeding the Future with Canadian Technology

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REFERENCES

Brown, T. (2009) Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation. Haper Collins. New York, NY.

IDEO. (2011). The Field Guide to Human Centered Design. IDEO.org. San Francisco, CA.

Israel, B. A., Schulz, A. J., Parker, E. A., & Becker, A. B. (1998). Review of community-based research: Assessing partnership approaches to improve public health. Annual Review of Public Health, 19(1), 173–202.

Kalibata, A., Nabarro, D. (2024). Food systems transformation through dialogues. Nature Food (October 22, 2024). https://doi.org/10.1038/s43016-024-01060-4

Mor Barak, M. E. (2015). Inclusion is the key to diversity management, but what is inclusion?. Human Service Organizations: Management, Leadership & Governance, 39(2), 83-88.

Minkler, M. (2005). Community-based research partnerships: challenges and opportunities. Journal of Urban Health, 82, ii3-ii12.

Lasker, R. D., Weiss, E. S., & Miller, R. (2001). Partnership synergy: a practical framework for studying and strengthening the collaborative advantage. The Milbank Quarterly, 79(2), 179-205.

Singh, B. K., Fraser, E. D., Arnold, T., Biermayr-Jenzano, P., Broerse, J. E., Brunori, G., ... & Webb, P. (2023). Ensuring societal considerations are met when translating science into policy for sustainable food system transformation. Trends in Food Science & Technology, 137, 104-108.

Singh, B. K., Fraser, E. D., Arnold, T., Biermayr-Jenzano, P., Broerse, J. E., Brunori, G., ... & Webb, P. (2023). Food systems transformation requires science–policy–society interfaces that integrate existing global networks and new knowledge hubs. Nature Food, 4(1), 1-3.

Stringer, L. C., Dougill, A. J., Fraser, E., Hubacek, K., Prell, C., & Reed, M. S. (2006). Unpacking "participation" in the adaptive management of social–ecological systems: a critical review. Ecology and Society, 11(2).

United Nations. (2021). Food Systems Summit Dialogues. https://www.un.org/en/food-systems-summit/dialogues

World Vision & 4SD Foundation. (2024). Nutrition Dialogues. https://nutritiondialogues.org/