Building a Community-Based Participatory Food Systems Approach to Indigenous Food Security and Food Sovereignty in Kahnawà:ke, Québec, Canada

Shannon Udy

School of Human Nutrition, McGill University, Montréal

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Abstract

Indigenous Peoples in Canada are disproportionately affected by food insecurity and poorer health outcomes. Wholistic approaches considering all aspects of the food system are needed to plan systemic community food security actions. Using a food systems approach, the purpose of this study was to design a participatory process resulting in a shared vision and understanding of a food system grounded in the values of one Indigenous community to promote food security, nutrition, and well-being. In partnership with the Kahnawà:ke Schools Diabetes Prevention Program (KSDPP), this study arose to support community-driven planning efforts for food security and food sovereignty in the Kanien'kehá:ka (Mohawk) community of Kahnawà:ke, Québec.

This study proposes a community-based participatory food systems approach to Indigenous food security and food sovereignty. It weaves Indigenous and Western (community-based participatory research, community-based system dynamics) research and planning methodologies to identify and explore community food system priorities and the complex system of factors structuring equitable food system outcomes, oriented toward planning strategies for systemic change. Through a series of participatory visioning and group model building workshops, two diverse groups of community participants were engaged in exploring their hoped future for Kahnawà:ke's food system, developing a food systems model (causal loop diagram) centring a key priority issue, and identifying actions to create desired food system change. Workshop data were analyzed qualitatively to characterize participants' shared vision and understanding of their food system.

This research builds upon current efforts to close gaps in Indigenous food security, nutrition, and well-being by contributing a community-based participatory food systems

approach to Indigenous food security and food sovereignty. By reflecting community knowledge and values, the development of a shared vision and understanding of Kahnawà:ke's food system strives to enhance community capacity, mobilization, collaboration, and successful action planning for community-identified priorities. This study offers researchers, practitioners, and Indigenous communities an example of how to respectfully bring together multiple methodologies to address community research needs in a manner that prioritizes Indigenous knowledge and ways of knowing, cultural practices, and values and promotes community self-determination and empowerment in the context of food security and food sovereignty research and planning.

Ethical approval was obtained from KSDPP and McGill University's Research Ethics Board with financial support from the Canadian Institutes of Health Research, First Nations Child and Family Services (Kahnawà:ke Shakotiia'takehnhas Community Services), and Maple Leaf Centre for Food Insecurity.

Résumé

Les Peuples Autochtones du Canada sont touchés de manière disproportionnelle par l'insécurité alimentaire et de faibles résultats de santé. Des approches holistiques qui prennent en considération tous les aspects du système alimentaire sont nécessaires à la planification systémique communautaire améliorant la sécurité alimentaire. Par le biais d'une approche basée sur les systèmes alimentaires, l'objectif de cette étude était de conceptualiser un processus participatif arrimé aux visions et aux compréhensions communiques de systèmes alimentaires ancrés dans les valeurs d'une communauté autochtone dans le but de promouvoir la sécurité alimentaire, la nutrition, et le bien-être. En partenariat avec le Projet de prévention du diabète dans les écoles de Kahnawà:ke (KSDPP), cette étude a émergé afin de supporter les efforts communautaires de planification en sécurité alimentaire et souveraineté alimentaire dans la communauté Kanien'kehá:ka (Mohawk) de Kahnawà:ke, Québec.

Cette étude promeut une approche participative des systèmes alimentaires basée dans la communauté et portant sur la sécurité alimentaire et la souveraineté alimentaire. Elle tisse ensemble des méthodologies de recherche et de planification autochtones et occidentales (approche participative basée dans la communauté, système de la dynamique des communautés) afin d'identifier et d'explorer les priorités des systèmes alimentaires et le système complexe de facteurs facilitant des résultats équitables de systèmes alimentaires dirigés vers la planification stratégique favorisant des changements systémiques. Par le biais d'une série de visionnement participative et d'ateliers de groupe d'élaboration de modèle, deux groupes hétérogènes de participants communautaires se sont engagés dans l'exploration de leurs souhaits pour le futur du système alimentaire de Kahnawà:ke en développant un modèle de systèmes alimentaires

(diagrammes de boucles causales) centré sur un enjeu prioritaire clé, et identifiant des actions afin de générer des changements au niveau du système alimentaire. Les données collectées lors des ateliers ont été analyses qualitativement afin de définir les visions partagées des participants et leur compréhension de leur système alimentaire.

La présente étude est basée sur les efforts actuels de combler des lacunes en sécurité alimentaire, nutrition et bien-être autochtones dans le but de contribuer aux approches des systèmes alimentaires participatifs basés dans la communauté en matière de sécurité alimentaire et de souveraineté alimentaire autochtones. En mettant de l'avant les savoirs et valeurs communautaires, le développement de vision et compréhension communes du système alimentaire de Kahnawà:ke cherche à améliorer la capacité, la mobilisation, la collaboration et la planification d'actions efficaces communautaires mettant de l'avant les priorités identifiées par la communauté. Cette étude offre aux chercheurs, professionnels et communautés autochtones un exemple de comment combiner de façon respectueuse plusieurs méthodologies afin de répondre aux besoins communautaires en recherche d'une manière qui priorise les savoirs et façons de savoirs, les pratiques culturelles et les valeurs autochtones; et de promouvoir l'autodétermination et l'autonomisation communautaire en contexte de recherche et planification en sécurité alimentaire et de souveraineté alimentaire.

Une approbation éthique a été obtenue de KSDPP et du comité de révision éthique de McGill avec un appui financier des Instituts canadiens de recherche en santé, Services à l'enfance et à la famille des Premières Nations (Kahnawà:ke Shakotiia'takehnhas Community Services) et Centre Maple Leaf pour l'insécurité alimentaire.

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List of Abbreviations

KSDPP	Kahnawà:ke Schools Diabetes Prevention Program

Glossary

Kanien’kehá:ka	Mohawk People
Kahnawa’kehró:non	People of Kahnawà:ke

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Contribution of Authors

Shannon Udy is the master's thesis candidate. Shannon performed the literature review, wrote the research proposal, co-developed the study design and methodology, and created all study related documents. With guidance from her supervisor, Shannon applied for and obtained the required ethical approvals and amendments for this study and coordinated participant recruitment and all research meetings and data generation activities in Kahnawà:ke. Workshop transcriptions, data analyses, and interpretation were performed by Shannon. She also wrote the drafts of this thesis and both manuscripts.

Dr. Treena Delormier is the thesis supervisor of the master's thesis candidate. She provided supervision, guidance, and feedback throughout the entire research process. Dr. Delormier contributed to the conceptualization of the study, refinement of research questions, co-development of the study design and methodology, and provided guidance and support during the implementation of study activities in Kahnawà:ke. Dr. Delormier reviewed and edited drafts of the two manuscripts as well as the entirety of this thesis.

Introduction of Thesis

This thesis describes the collaborative development and implementation of a study employing a community-based participatory food systems approach to Indigenous food security and food sovereignty, co-designed for use within the Kanien'kehá:ka (Mohawk) community of Kahnawà:ke, Québec, Canada. The purpose of this study was to develop a values-based vision and shared understanding of Kahnawà:ke's food system among Kahnawa'kehró:non (people of Kahnawà:ke). Using a participatory process, this study aimed to answer the following three questions: 1) what is Kahnawa'kehró:non's vision for a hoped future for their food system? 2) from a systems perspective, what is Kahnawa'kehró:non's understanding of current food system priorities? and 3) what are opportunities for systemic actions impacting current food system priorities identified by Kahnawa'kehró:non? This thesis consists of four main chapters, each addressing a distinct component of the research.

Chapter 1: Introduction, Literature Review, and Methodological Approach (Manuscript 1)

This first manuscript sets the stage by positioning the master's candidate (Shannon Udy) within the research and contextualizing the study within the community and existing literature on Indigenous food security, food sovereignty, and systems approaches to research and planning. It then outlines the methodological approach designed for this study and discusses, in concept and practice, the strengths of weaving the Indigenous and Western (community-based participatory research, community-based system dynamics) research and planning methodologies employed. This manuscript was accepted for peer-reviewed publication in the Knowledge Makers Journal, Volume Eight, a special edition in partnership with the United Nations Food and Agriculture Organization focusing on Indigenous women, Indigenous Peoples' food and knowledge systems, and climate action (Udy & Delormier, in press).

Chapter 2: Methods and Tools (Bridge 1)

Here, the specifics of the methods and tools utilized in the research process are detailed, such as participant recruitment, data generation and analysis methods, ethical considerations, and dissemination. This chapter provides insight into the practical aspects of the study implementation.

Chapter 3: Visioning Research Findings (Bridge 2)

This chapter presents the findings generated from the participatory visioning workshop, offering key themes and priorities expressing Kahnawa'kehró:non's vision for their food system. Participant characteristics, results of a qualitative content analysis of visioning data, and insights on key food system priorities are discussed.

Chapter 4: Overall Research Findings, Discussion, and Conclusion (Manuscript 2)

The second manuscript synthesizes the overall research findings from both the visioning and the group model building workshops, with emphasis on the results and findings of the group model building component. It offers a comprehensive discussion of the implications of the research process and findings derived from implementing a community-based participatory food systems approach to Indigenous food security and food sovereignty.

Conclusion to Thesis

This section serves as a summative reflection on the significance of the study findings, research process, and implications.

Together, these chapters and sections contribute to a wholistic understanding of Kahnawà:ke's food system vision and priorities and offer insights into pathways for enhancing and sustaining food security and food sovereignty action within the community. Through

collaborative engagement and participatory research, this study endeavoured to provide a planning approach supporting community food system change.

Chapter 1: Introduction, Literature Review, and Methodical Approach (Manuscript 1)

Building a Community-Based Participatory Food Systems Approach to Indigenous Food Security and Food Sovereignty

Shannon Udy and Treena Delormier

Who I am

Taanishi, Shannon Udy dishinihkaashoon. Hello, my name is Shannon Udy. I am a Métis woman with Métis and mixed European ancestry. My Métis roots are from my grandmother, Iona Ouellette, a descendent of the Métis People of the Red River Settlement (in present-day Manitoba, Canada). Like many Métis People, my ancestors were forced to deny and hide their Indigeneity to escape racism and discrimination. It was not until my early adulthood that my grandmother felt safe to share our family's heritage. For over half a decade I have been on an ongoing journey to understand and reconnect with my own cultural identity as a Métis woman through my grandmother's teachings and stories, the recorded history of my ancestors, language learning, and engaging with my Métis community. I was raised on Vancouver Island, Canada, as an uninvited but grateful visitor to the unceded lands of the Lək̓ʷəŋən Peoples and the Ligwiłda'xw Peoples. I am a citizen of the Métis Nation of British Columbia and belong to the North Island Métis Association, my local Métis chartered community.

My aspiration to become a Registered Dietitian brought me to McGill University in my early adulthood to pursue a B.Sc. in Nutritional Sciences–Dietetics. Since then, I have been based in Tiohtià:ke/Montréal, Québec, situated on the traditional territory of the Kanien'kehá:ka (Mohawk) Nation. During the final year of my undergraduate program, I was invited by Kanien'kehá:ka scholar and McGill University faculty member Treena Delormier to join the Kahnawà:ke Schools Diabetes Prevention Program (KSDPP), a 29-year-old community-

academic research partnership aiming to prevent type 2 diabetes in the Kanien'kehá:ka community Kahnawà:ke, Québec. KSDPP is a community-based participatory research program with a high degree of community involvement and ownership (Salsberg et al., 2017; Tremblay et al., 2018). It is a research and training centre providing academic training for master's, doctoral, and postdoctoral students interested in Indigenous health. KSDPP also engages in food security and food sovereignty initiatives in Kahnawà:ke as part of its diabetes prevention vision. During my time as a KSDPP undergraduate research trainee, I fortunately became involved in food security and food sovereignty community initiatives in Kahnawà:ke where exposure to community-based participatory research shaped my developing perspective of research and its potential for Indigenous Peoples' health. I gained an awareness of how research can effectively respond to community priorities and underlying social inequities by supporting Indigenous ownership and governance of research and health promotion efforts anchored in Indigenous culture and values. This experience inspired me to pursue graduate studies following my B.Sc. I am currently completing my master's research and training in partnership with KSDPP to contribute to community food security research needs while continuing to develop my knowledge and skills in public health nutrition, community-based participatory research, and Indigenous health. I position myself as an Indigenous woman (Métis, Red River Settlement) (re) learning many aspects of where I come from, who I am, and where I am going. In a few ways I consider myself an "insider" to my topic as an Indigenous dietitian but in other ways, I am an "outsider" as a guest who is doing research with Kahnawa'kehró:non (people of Kahnawà:ke).

Introduction

The COVID-19 pandemic heightened challenges and concerns for ensuring that all Kahnawa'kehró:non could access enough healthy, safe, and culturally appropriate food. Kahnawà:ke's Food Security and Food Sovereignty Working Group arose amid the pandemic to support community mobilization efforts and provide emergency food services while recognizing an ongoing need to address community food security and food sovereignty priorities. I was invited to participate in this inter-organizational working group as a KSDPP research trainee where group discussions emphasized the need to consider the role of the community food system in planning wholistic and coordinated food security and food sovereignty action strategies. This paper presents a participatory food systems approach to community food security and Indigenous food sovereignty in Kahnawà:ke. The approach bridges Indigenous and Western research and planning methodologies to identify and explore community food system priorities and the complex system of factors structuring equitable food system outcomes, oriented toward planning strategies for systemic change. Few papers have elaborated how to respectfully bring together multiple methodologies to address community research needs in a manner that prioritizes Indigenous knowledge and ways of knowing, cultural practices, and values and promotes community self-determination and empowerment in the context of food security and food sovereignty research and planning. The remaining sections of this paper will describe the methodological approach designed for our study, tracing our engagement and application of the methodologies and methods it encompasses. It will then discuss essential features that interlace the strengths of Indigenous research and planning methodologies, community-based participatory research, and community-based system dynamics, emphasizing bridging concepts to practice for Indigenous food security and food sovereignty research and planning.

Community and Research Context

Kahnawà:ke is situated on the south shore of the Saint Lawrence River, approximately 15 kilometres from the city of Montréal. Kahnawà:ke is home to approximately 8,079 residents (Indigenous Services Canada, 2023). It is one of eight territories that make up the Mohawk Nation and is part of the Haudenosaunee or Six Nations Iroquois Confederacy (Kahnawake Longhouse, n.d.). Presently, Kahnawà:ke relies largely on food produced outside the territory; however, an increasing number of Kahnawa'kehró:non are returning to planting, producing food, and continuing cultural food practices that reflect traditional relationships and responsibilities (Delormier et al., 2017). Food security is acknowledged locally as a key social determinant of health and community priority connected to Kahnawà:ke's greater food sovereignty movement and efforts to reclaim community governance of the food system. Kahnawà:ke's food security and food sovereignty are supported through an extensive health and social services infrastructure, grassroots initiatives, and community-governed research capacity.

Since becoming a KSDPP research trainee, I have formed key relationships and an essential understanding of community needs and values which form the basis for my master's research project. This study is marked by a collaborative research partnership in which ownership of the research process is shared and for this reason, I choose not to refer to this study as mine but as ours. The idea for our study arose within current community efforts to build food security and Indigenous food sovereignty. It is grounded in a community identified need for a comprehensive approach to guide planning for food security and food sovereignty actions. The purpose of our study is to develop a values-based vision and shared understanding of Kahnawà:ke's food system using a food systems approach to community food security and Indigenous food sovereignty. Our study proposes a novel participatory food systems approach

that weaves Indigenous research and planning methodologies, community-based participatory research, and community-based system dynamics to answer the following three questions: 1) what is Kahnawa'kehró:non's vision for a hoped future for their food system?; 2) from a systems perspective, what is Kahnawa'kehró:non's understanding of current food system priorities?; and 3) what are opportunities for systemic actions impacting current food system priorities identified by Kahnawa'kehró:non? Our study design recognizes that solutions to promote food security and food sovereignty must be wholistic, strength-based, and prioritize community needs, knowledge, values, practices, and worldview. At the time of writing this paper, our study is entering the initial stages of data generation.

The Need for a Community-Based Participatory Food Systems Approach for Indigenous Food Security and Food Sovereignty

Food security is an important public health issue in Canada because nutrition, health, and well-being are closely linked to food security status (Jessiman-Perreault & McIntyre, 2017; Kirkpatrick & Tarasuk, 2008; Melchoir et al., 2012; Men et al., 2020; Tait et al., 2018). Food security exists "when all people, at all times, have physical and economic access to sufficient, safe and nutritious foods to meet their dietary needs and food preferences for an active and healthy life" (Food and Agriculture Organization of the United Nations [FAO], 1996, action 1). In contrast, food insecurity means that food access or availability is insufficient. Indigenous Peoples are disproportionately burdened by food insecurity and poorer health outcomes, including multiple nutrition-related chronic diseases (Andersen et al., 2016; Batal, Chan, Fediuk, Ing, Berti, Mercille, et al., 2021; Egeland et al., 2010; Rosol et al., 2008; Tarasuk & Mitchell, 2019; Willows et al., 2011).

Dominant approaches of conceptualizing and addressing food security tend to focus on people's economic and physical access to food from market (commercial) food systems at an individual or household level (Loopstra, 2018). Such approaches fail to acknowledge the protective factors of Indigenous Peoples' food systems (Power, 2008), which refer to foods harvested locally that are sustained by cultural values, knowledge, and practices (Kuhnlein & Receveur, 1996). Indigenous Peoples' food systems are significant and essential to community food security, providing sustainable, high quality, nutritionally dense, and culturally preferred foods (Batal, Chan, Fediuk, Ing, Berti, Sadik et al., 2021ab; Kuhnlein, 2015), in addition to being an integral part of Indigenous culture, identity, and well- being (Blanchet et al., 2020; Delormier et al., 2017; Egeland & Harrison, 2013). Access to traditional foods, lands, and resources for which Indigenous food systems are based, has rapidly declined because of colonization (FAO, 2021). However, many Indigenous communities are reclaiming their food systems and food security through a food sovereignty approach (e.g., Delormier & Marquis, 2018; Sowerwine et al., 2019).

Indigenous food sovereignty is an approach to achieving community food security by reclaiming the decision-making power within local food systems (Morrison, 2011). It advocates for the revitalization of Indigenous food systems, emphasizing the self-determination of distinct Indigenous groups to define their own food systems (Settee & Shukla, 2020). While expressions of Indigenous food sovereignty take varying forms, it is recognized as a rights-based, decolonial, and community-led approach to restoring culture, environments, governance, food security, and health (Blue Bird Jernigan et al., 2021; Grey & Patel, 2015; Sampson et al., 2021).

Given the persistent inequities in food insecurity rates for Indigenous communities and the importance of community-led efforts to act upon this determinant of health, community food

security and Indigenous food sovereignty call for long-term, systematic, and wholistic approaches. This paper offers researchers, public health practitioners, and Indigenous communities a new participatory food systems approach to community food security and Indigenous food sovereignty that supports desired community food system planning and collective action.

Food Systems Approach

A food systems approach is a promising framework for exploring various food system components and their relationships to address complex issues and achieve systemic changes (Nguyen, 2018). By applying systems science and systems thinking concepts and methods, it moves beyond reductionist thinking to account for system complexity, recognizing that outcomes (e.g., equitable access to food) emerge from a system as a whole (Clancy, 2022). Reductionist thinking pertaining to food system challenges results in siloed approaches and isolated interventions focused on technical fixes (Ingram, 2011; Nguyen, 2018). A food systems approach emphasizes broadening perspectives to consider the many related interacting factors that shape food system outcomes over time and to coordinate multiple actions to address root causes (Nguyen, 2018). In recent decades, food systems approaches have been increasingly used at national and global levels to understand and plan actions for environmental change, food security, nutrition, and social equity (Brouwer et al., 2020). Using a food systems approach, the food system is initially assessed to provide an analytical base which serves to foster discussions and guide context-specific action planning for desired food system outcomes (Ingram, 2011). Further, it can support a vision, balanced across a set of shared values, to guide a process of food systems change and “to inspire, mobilize, and keep a collective of people on track toward their goals” (Anderson, 2019, p. 55).

The current application of a food systems approach is variable in scale and quality with little attention to local food systems change, stakeholder engagement, and research power dynamics, and with inconsistent use of systems concepts and methods geared toward wholistic interventions (Brouwer et al., 2020; Clancy, 2022; Waterlander et al., 2018). It has had sparse application to the distinct food systems and efforts of Indigenous communities to reclaim their food systems. Existing published literature using a food systems approach to food security with Indigenous communities comes from research conducted in a remote Australian context using a participatory process and tool (Brimblecombe et al., 2015). Limitations included an inability to elucidate linkages and feedbacks between various areas of local food systems. Authors of this work suggest further use of participatory, structured approaches to promote collaboration between food system sectors and community groups (Rogers et al., 2018). Group model building is a suggested systems approach with potential for further work in this area (Brimblecombe et al., 2017).

Group Model Building

Group model building is a participatory systems science method where stakeholders engage in building a system dynamics model to represent their shared understanding of a complex system issue (Hovmand, 2014). System dynamics models help stakeholders visualize and analyze the system structure and relationships underlying a complex issue and explore potential interventions (Gerritsen et al., 2020). Group model building has been used across multiple disciplines, including public health and health promotion projects in diverse contexts (Carey et al., 2015; Saryazdi et al., 2021; Zukowski et al., 2019). It has demonstrated potential to align with Indigenous ways of knowing, being, and doing when culturally adapted (Browne et al., 2021; Heke et al., 2019; LaVallee, 2014). A recent study using group model building in

Hawke's Bay, New Zealand demonstrated meaningful community engagement in a manner consistent with an Indigenous (Māori) worldview by collaboratively mapping the food system and identifying interventions to improve children's nutrition (McKelvie-Sebileau, Gerritsen et al., 2022). Growing interest in applying systems approaches to address the conditions underlying health and social inequities in public health (Carey et al., 2015; Zukowski et al. 2019) is evoking innovative approaches and opportunities for researchers and Indigenous Peoples seeking to enhance community health through systemic change (Hernández et al., 2017). However, no published articles to date explore how a food systems approach can be used in research and practice for and with Indigenous Peoples for the purpose of community food security and Indigenous food sovereignty planning.

A Community-Based Participatory Food Systems Approach for Indigenous Food Security and Food Sovereignty

Indigenous Research and Planning Methodologies

Indigenous research and planning methodologies are grounded in relationality, the ontological understanding that the world is constituted in relationships (Matunga 2013; Wilson, 2008). Guided by *relational accountability*, or being accountable to *all my relations* when doing research, a research methodology is an important process for cultivating relationships that are respectful (to the research topic, oneself, community partners, participants), honour responsibilities (roles and obligations in research and ethics), and nurture mutual reciprocity (contributing to research relationships and the generation and sharing of knowledge) (Wilson, 2008). Indigenous research paradigms recognize that knowledge is a shared, not individual or owned endeavour, both in its creation and application. Relational accountability refers to the ways in which researchers fulfill their responsibilities to the relationships that are established

when conducting research in partnership with an Indigenous community (Wilson, 2008). Relational ways of doing are reflected in each step of a research process through respectful collaboration (e.g., determining the research question, methodology, and methods; generating, analyzing, and interpreting data; and in the dissemination of findings) (Wilson, 2008). In the context of Indigenous planning, a research methodology serves as a future-oriented process and expression of self-determination connecting people, place, knowledge, values, and worldview, with decisions and actions to promote community health and well-being (Matunga, 2013). Indigenous planning also centres intergenerational relationships as they connect past values and practices with the everchanging present, all in the context of planning for the future (Jojola, 2013).

This participatory food systems approach aligns Indigenous and Western research and planning methodologies. Bridging Western (i.e., community-based participatory research, community-based system dynamics) and Indigenous relational ways of knowing and doing requires building and maintaining respectful relationships and upholding Indigenous perspectives in design, implementation, and analysis processes (Elliot et al., 2012). Two-eyed seeing proposed by Mi'kmaw elders Albert and Murdena Marshall, is an approach to inquiry for bridging multiple ways of knowing (Hill & Coleman, 2019). Two-eyed seeing is "the ability to see with one eye the strengths of Indigenous ways of knowing and with the other eye the strengths of Euro-Western ways knowing and using both of these eyes together" (Vukic et al., 2012, p. 148). In our study, we also take guidance from Two Row wampum teachings from the earliest treaty between Haudenosaunee and early settlers (Hill and Coleman, 2019). The treaty uses the metaphor of two vessels traveling the river of life, a ship representing settler culture and ideologies, and the other a canoe holding Haudenosaunee laws and ways of living which are

respectful and balanced with nature. The vessels are depicted on the wampum belt as two parallel rows of purple beads on a white background, showing non-interference in each other's ways. Applied in research we respect that distinct Indigenous and Western research paradigms can co-exist harmoniously. Two Row research entails creating spaces where distinct and diverse perspectives can engage in respectful dialogues, value knowledge as co-created and shared, and oriented to upholding responsibilities to the gifts of creation and considering the well-being of future generations (Hovey et al., 2017; Freeman & Van Katwyk, 2020). Two Row teachings and two-eyed seeing offer guidance for fulfilling relational responsibilities in the research and planning processes; the KSDPP Code of Research Ethics and community-based participatory research offer a culturally relevant framework of community engagement and collaboration between myself (the researcher) and the community of Kahnawà:ke; and community-based system dynamics offers a set of adaptable methods and tools to enable the systemic exploration of the relationships, interconnections, and factors structuring community food system priorities. Through building and maintaining respectful and collaborative relationships, the participatory processes integrated into this food systems approach prioritize Indigenous knowledge and meaningfully integrate cultural practices and values throughout the research process. For instance, the present study will integrate community practices for visioning, ceremony, and knowledge sharing, and respect core cultural values such as youth and elder involvement, collective thinking, and considering future generations under the KSDPP Code of Research Ethics (KSDPP, 2023).

Community-Based Participatory Research

Our study is embedded in current community efforts among various programs and groups working to enhance food security and Indigenous food sovereignty in Kahnawà:ke by responding

to the community-identified need for a planning approach to guide collaborative and collective community action. Initial support for the research idea emerged during the summer of 2021, prior to engaging in the research project, through actively participating in ongoing discussions and consultation meetings with Kahnawà:ke's Food Security and Food Sovereignty Working Group. The idea was then further developed into a proposed research project that was presented to the KSDPP for review and approval. Our study follows the KSDPP Code of Research Ethics, which outlines a set of collaborative and ethical principles, procedures, obligations, and rights to guide academic and community research partners throughout the research process (KSDPP, 2023). The code asserts Kahnawà:ke's self-determination and expertise in research and in creating knowledge for the well-being of future generations of Kahnawa'kehró:non, which it bridges with community-based participatory research principles.

Community-based participatory research is an orientation to research that seeks to engage researchers and community members as equal partners pursuing a common purpose of creating knowledge and social change (Israel et al., 2013). Community-based participatory research is a valuable approach for research with Indigenous Peoples, emphasizing the importance of building and nurturing collaborative, respectful, and reciprocal relationships among partners, balancing power differences within the research process, and ensuring community self-determination and empowerment (Tobias et al., 2013). Collaboration and active involvement of community partners are the heart of a community-based participatory research approach. Collaboratively developing, implementing, learning from, and acting on research with a community enhances its relevance and the credibility and applicability of the results (Macaulay et al., 1999). Community collaboration has taken place through the initial stages of our study and will continue through the KSDPP's Review and Approval Process for Ethically Responsible Research which is governed

by the Community Advisory Board (community partner) and the Research Team (academic partner) (Delormier et al., 2015). Community-based participatory research guides the research design through creating and engaging the dedicated participation of a workshop planning team (known as a core modeling team) and by the involvement of community participants in all stages of data generation and analysis by design.

Community-Based Food System Dynamics

A food systems approach considers the whole food system and its interconnected components interacting over time. The approach is rooted in systems science and systems thinking which recognizes that a complex system and issues embedded within it cannot be understood in view of isolated parts (Clancy, 2022; Story et al., 2009). Food systems function and interact at multiple scales ranging from local to global. Local food systems are diverse and place-based; however, most food systems approaches lack emphasis on community-based food systems and the participation of local stakeholders in determining solutions to community-identified issues within their specific contexts (Brouwer, 2020; von Braun et al., 2021). Systems science and community-based participatory research offer diverse complementary approaches and methods (Frerichs et al., 2016), and integrating the two has increasingly been applied for the purpose of understanding and addressing social and health inequities (e.g., BeLue et al., 2012; Freedman et al., 2022). Community-based system dynamics is one such approach that uses participatory group model building to engage community members in creating their own system dynamics models for understanding and visualizing systems, and designing strategies for desired systems change (Hovmand, 2014). Community-based system dynamics is a promising approach for involving community members in a food system modeling process to promote systemic change (Glickman et al., 2022). It places a particular focus on growing community capacity in

systems thinking and system dynamics modeling by using collective learning processes to promote collaboration and ownership around a model and generate insights for mobilization (Hovmand, 2014).

Community-based system dynamics uses group model building workshops to develop system dynamics models of a complex issue in partnership with community members (Hovmand, 2014). Causal loop diagrams are a tool from system dynamics modeling that helps visualize the components of a system structuring a priority issue and represent their relationships with one another using lines, arrows, and feedback loops (Zukowski et al., 2019). Developing causal loop diagrams with community stakeholders facilitates dialogue and builds consensus on how a system is structured and how to intervene (Hovmand, 2014). Community members analyze causal loop diagrams qualitatively by describing the structure, subsystems, and feedback loops that are identified in this process. Community-based system dynamics projects typically involve three components: 1) problem scoping in which the issue to be modeled is identified; 2) core modeling team planning for the design and implementation of group model building workshops; and 3) group model building with community participants (Hovmand, 2014).

Our study proposes participatory visioning involving diverse participants representing unique perspectives on the community food system. This approach aims to build consensus on a hoped future for the community food system and identify a priority issue that will become the focus of group model building workshops. Our decision to design visioning as a first step in this participatory planning process arose from meetings with key community members and KSDPP's Community Advisory Board. Community members expressed the importance of including community planning practices and broad community participation in defining food system priorities. Participatory visioning has been integrated as a novel and culturally relevant problem

scoping method. Following a community visioning workshop, a group model building process will be used to operationalize a food systems approach by co-creating a food system model (causal loop diagram) to visually depict a shared understanding of Kahnawà:ke's food system with a smaller group of community stakeholders with diverse roles, expertise, or interest in the priority issue. The food system model will subsequently be used to identify opportunities (actions) to intervene with the system to impact current food system priorities through systems change. Community visioning and group model building workshops and activities will integrate general participatory visioning (Jojola, 2013; Umemoto, 2001; Walzer & Hamm, 2012; Wiek & Iwaniec, 2013) and group modeling building principles and structure (Gerritsen et al., 2020; Hovmand, 2014, Hovmand et al., 2015), guided by culturally relevant food system, food security, and food sovereignty concepts and literature. Further details are found in Table 1. The participatory process aims to foster community ownership and sustainability for food security and food sovereignty planning and action in Kahnawà:ke by growing community capacity in systems thinking and group model building. Therefore, this study will use a community-based system dynamics approach to respond to the research questions, since it values integrating the perspectives, knowledge, and experiences of a diverse group of community members about their food system through participatory community visioning practices and group model building workshops.

Table 1. Visioning and Group Model Workshop Core Activities and Outputs

Activity	Description	Outputs
Creating a Shared Vision	Participants write vision reflections on paper as words, statements, or drawings and are invited to share in small and full group discussions. Participants and core modeling team work collaboratively to identify themes.	• Reflections organized as thematic vision clusters
Priority Setting	Participants identify and rank priorities for Kahnawà:ke's future food system using dot vote.	• List of ranked priorities
Presenting the Vision and Key Priority	Participants review the food system vision and priorities and ensure consensus on the priority issue the food system model will seek to address. Participants discuss how to represent trends in the priority issue.	• Graph depicting changes over time and hoped and alternate scenarios for the future
Graphs Over Time	Participants brainstorm food system factors influencing the priority issue and how they have changed over time.	• Graphs of candidate factors for connection circles
Connection Circle	Participants map factors that influence the priority issue; linkages are drawn between factors. Participants complete connection circles in groups and discuss with the entire group.	• 1 connection circle per group
Causal Loop Diagram	Participants are guided in expanding upon linkages in connection circles, adding positive or negative directionality, and connecting feedback loops. Participants complete causal loop diagrams in groups and discuss with the entire group.	• 1 causal loop diagram per group
Model Review	Consolidated causal loop diagram, themes, and descriptions are shared with participants for feedback and revision.	• Validated causal loop diagram and themes
Action Ideas	Participants identify opportunities for action, share insights, and prioritize actions along a priority matrix.	• List of prioritized opportunities for action

A Community-Based Participatory Food Systems Approach in Practice

This section presents essential features offered as principles that weave the strengths of Indigenous and Western (community-based participatory research, community-based system dynamics) research and planning methodologies to demonstrate to researchers, public health practitioners, and Indigenous communities the potential of a participatory food systems approach for community food security and Indigenous food sovereignty. I discuss how these features can guide the practice of research and planning for Indigenous Peoples' food systems, community food security, and Indigenous food sovereignty. While each feature underlying this participatory food systems approach is discussed separately, it is important to recognize that they are interconnected, interdependent, and synergistic.

Participatory

Foundational is the equitable and full participation of community members at each stage of the research and planning process. Deeply rooted community participation brings to the forefront community voices on key priority issues that will ultimately impact people in their daily lives (Israel, 1998). In practice, this means ensuring community members have opportunities for involvement in all aspects of the research. In our study, community partners have participated in key decision making regarding the research topic, objectives, and study design. Community discussions and consultation meetings with Kahnawà:ke's Food Security and Food Sovereignty Working Group helped shape the research topic and objectives to directly support community needs and priorities. The study was also presented, reviewed, and approved by KSDPP's Research Team (for scientific rigour and feasibility) and the Community Advisory Board (for cultural relevance and benefit to the community). Community participation is also realized through engaging a core modeling team who will share the responsibilities for the

design, planning, recruitment, facilitation, and analysis of community group workshops (Hovmand, 2014; Richardson & Andersen, 1995). Each team member will fulfill an important perspective and role in the design and convening of community workshops: substantive, methodological, logistical, and community voice (Ballard et al., 2020). The core modeling team is an essential element of this community-led planning process that helps ensure community visioning and group model building workshops and activities are responsive to the local and cultural context. Collectively, participatory visioning and group model building workshops engage community members in understanding, analyzing, and planning actions toward community food system priorities of which they are experts. Community members also participate directly in data analysis and validation of the findings through vision and model review activities embedded within community workshops.

Wholistic

This participatory food systems approach reflects an understanding that Indigenous Peoples' food systems do not align with prevailing food systems conceptualizations as linear value chains (FAO, 2021). Rather, Indigenous Peoples' food systems are biocentric and relational, encompassing diverse food generation and production, processing, distribution, and consumption practices that are sustaining for future generations and shaped by and interconnected with nature, spirituality, ancestral knowledge, socio-cultural values, and evolving ways of life (Kuhnlein & Receveur, 1996; FAO, 2021). Within the literature, systems science and systems thinking approaches hold parallels or intersections with the wholistic and system-based worldview of many Indigenous Peoples (Browne et al., 2021; Goodchild et al., 2021; Heke et al., 2019; LaVallee, 2014, McKelvie-Sebileau, Pekepo et al., 2022). While these parallels or intersections have seldom been explored in detail, the literature suggests that systems thinking

and participatory system dynamics approaches, with their emphasis on exploring the relationships, interconnections, and interactions of factors that make up complex and dynamic systems, align well with Indigenous ways of knowing. Systems thinking and system dynamics argue that system structure determines patterns of behaviour, that result in outcomes we see (Hovmand, 2014). When practiced from Indigenous perspectives, systems thinking and system dynamics approaches such as group model building have demonstrated value and applicability for the exploration of system structure, relationships, and patterns of behaviour using participatory system dynamics modeling processes that retain the integrity of distinct Indigenous worldviews (Browne et al., 2021; Heke et al., 2019). Shared features that bridge these distinct ways of knowing, as described by researchers working in partnership with diverse Indigenous groups (e.g., Māori, Indigenous Australians, Métis) to understand and address priority issues (e.g., obesity, food security, tuberculosis), include wholism, interconnectedness, relationality, visual learning, storytelling, and honouring multiple perspectives (Browne et al., 2021; Heke et al., 2019; LaVallee, 2014, McKelvie-Sebileau, Pekepo et al., 2022). In the context of our study, a wholistic and systemic exploration of community food system priorities is achieved using group model building to create a causal loop diagram that integrates community understandings of the system structure and relationships underlying system behaviour and enables community members to collaboratively explore potential impacts of current decisions and actions in shaping community food system priorities and outcomes for future generations.

Relational

As discussed earlier, Indigenous research and planning methodologies respect that knowledge is dependent on the relationships we uphold (Wilson, 2008). This participatory food systems approach is relational not only in the relationships it fosters between academic and

community partners, the research ideas it collaboratively creates, and the community food system it envisions but also in the interpersonal and intergenerational community relationships it builds in practice. Participatory visioning and group model building are complementary participatory methods that promote community collaboration, consensus building, and collective action on key community priorities. They each bring together knowledgeable community members and stakeholders interested in participating in dialogues, sharing stories, teachings, and insights, and contributing to decision-making about community food system futures and possibilities. Thus, the engagement process creates shared spaces for bringing diverse perspectives together and learning from one another, and for individuals to experience their contribution to the visioning and model building efforts, and how they can mobilize toward the desired food system. Everything in visioning and group model building is done as a group such that the knowledge, insights, and decision making that occurs reflects the collective. These relational qualities of working as a collective and striving for consensus in decision-making remain fundamental to the cultural practices of many Indigenous Peoples who understand that supportive community relationships are fundamental to food security (Delormier et al., 2017; Delormier & Marquis 2018; FAO, 2021).

Self-Determination and Empowerment

At its core, this participatory food systems approach is about creating community food systems change by placing Indigenous Peoples and their distinct practices and values at the centre of a community-led change process. This approach respects community self-determination and empowerment. In practice, this participatory planning framework develops a values-based vision and shared understanding of community food system priorities, while generating system insights and community action strategies. Participatory visioning and group model building

workshops generate a wholistic view of key community food system priorities that enables integrating perspectives in collective analysis that guides action responsive to local strengths, resources, and values. This collaborative and participatory process aims to mobilize collective action by building community capacity to understand and create change in the food system. Community partners and workshop participants will build or enhance their knowledge and skills in systems thinking and system dynamics approaches to support the ongoing use and development of the community food system vision, model, and shared insights. This process promotes community ownership and creates conditions to strengthen existing community relationships for sustained mobilization and collective action beyond the research. As well, to equip community stakeholders in advocating for and implementing food security and governance strategies that account for the cultural and structural context to drive desired systems change. Thus, in addition to knowledge creation, a desired outcome of this participatory approach is enhancing community empowerment to engage with the systems that shape food security, nutrition, and well-being.

Conclusion

This paper has explored a participatory food systems approach to community food security and Indigenous food sovereignty designed for one Indigenous community seeking to develop a contextually grounded understanding of the factors, relationships, interconnections, and feedback loops structuring community food system priorities. The approach facilitates community identification of key intervention points within the local food system to overcome systemic issues contributing to food insecurity and advance a community vision of a food system and the values it reflects. The primary benefit of this study for Kahnawà:ke is to ignite and sustain a community-engaged planning process for food security and food sovereignty.

As this paper comes to a close, I would like to reflect on two anticipated challenges that researchers and public health practitioners could experience when applying this approach for and with communities that are not their own. First, is understanding that meaning is embedded in culture, history, collective experience, and language (Umemoto, 2001). For this reason, researchers and practitioners should engage in research and planning through community partnerships and commit themselves to an ongoing journey of learning about and from a particular community, both individually and as part of a research co-learning process. Community participation in all aspects of the research, including data analysis and interpretation, can help ensure that community knowledge, experiences, and perspectives have been accurately reflected by the research findings. A second challenge is understanding the role of power (Clancy, 2022; Umemoto, 20001). Researchers and practitioners may be positioned as experts or leaders in a project and required to shift power over the design and implementation of a participatory food systems approach to the core modeling team and community partners. To equalize power differences within the research and planning process, researchers and practitioners should carefully reflect on the importance of relationships as they exist through all aspects of the research process and engage with the concepts of respect, responsibility, and reciprocity to support the shift of power, knowledge, skills, and capacity to community members (Tobias et al., 2013; Wilson, 2008).

Bridging Indigenous and Western (community-based participatory research, community-based system dynamics) research and planning methodologies, this participatory food systems approach builds upon current efforts to close gaps in food security, nutrition, and well-being for Indigenous Peoples. A community-based participatory food systems approach represents a new way of thinking and addressing complex food-related issues such as community food security

and Indigenous food sovereignty. It offers a wholistic lens to explore the complexity of local food systems and honour the knowledge, culture, and values embedded in them. Planning and implementing contextually relevant actions to advance food security and health equity for Indigenous Peoples requires the engagement and full participation of Indigenous communities in research and planning that responds to their own needs and priorities for community health and well-being. This paper was written to offer researchers, public health practitioners, and Indigenous communities an approach aligning Western and Indigenous relational ways of knowing and doing to support community-led food system planning and change processes which elevate Indigenous Peoples' food and knowledge systems, promote empowerment, and advance equitable food system outcomes for all.

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Chapter 2: Methods and Tools (Bridge 1)

2.1 Indigenous Peoples' Food Systems

Indigenous Peoples' food systems do not align with prevailing conceptualizations of food systems as linear value chains (FAO, 2021). Rather, Indigenous Peoples' food systems are biocentric and relational, encompassing diverse food generation and production, processing, distribution, and consumption practices that are shaped by and interconnected with nature, spirituality, ancestral knowledge, socio-cultural values, and evolving ways of life (Kuhnlein & Receveur, 1996; FAO, 2021). Three interrelated concepts have been used to ground this study: 1) community food system, 2) food security, and 3) Indigenous food sovereignty. These three concepts functioned as a sensitizing conceptual frame to guide the design of community group workshops and conduct the analysis.

The food systems wheel for Indigenous Peoples' food systems of the Food and Agriculture Organization of the United Nations has been adapted for this study as a broad representation of the community food system concept that encompasses the key components of Indigenous Peoples' food systems and illustrates their interdependence with one another, the natural environment, and the socio-cultural context (Figure 1) (FAO, 2021). For the purposes of this study, the community food system concept centres Kahnawà:ke's shared vision of the food system and overall priorities of food security and food sovereignty. Positioned at the core of the food system, these aspects reflect the planning context, in which a vision brings a community's priorities and values forward to guide future planning and decision-making (Umemoto, 2001), as well as to reinforce the interdependence of food system components in shaping one another and a desired future. The essential concepts of food security and Indigenous food sovereignty have been expanded by drawing on existing literature, notably food security dimensions of

availability, access, and utilization (FAO, 2006), and Indigenous food sovereignty indicators proposed by Blue Bird Jernigan et al. (2021): access to resources, production, trade, food consumption, policy, community involvement, and culture.

In full recognition of Kahnawa'kehró:non's right to define their own food system, the community food system concept, its components, relationships among them, and meanings of those relationships continue to evolve in consultation with community members.

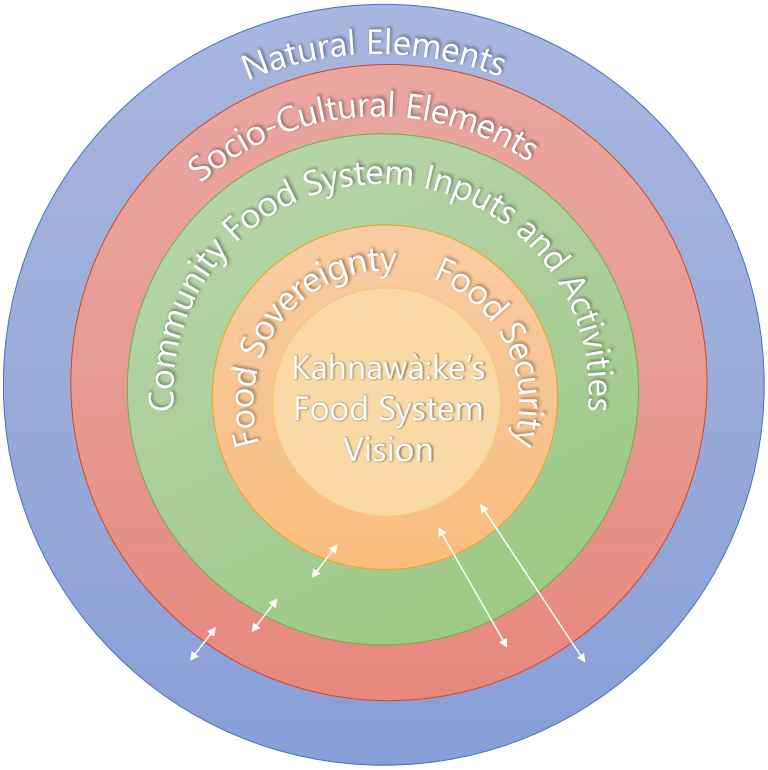


Figure 1. Community Food System Concept

Community food system concept adapted from "A food systems wheel for Indigenous Peoples' food systems" by FAO (2021) CC BY-NC-SA (21 p. 8)

2.2 Participant Recruitment and Selection

Participants were recruited in collaboration with the core modeling team and KSDPP community partners using maximum variation purposive sampling with the objective of diverse gender, generational, and stakeholder representation. Maximum variation purposive sampling is a technique attempting to capture the variability and diversity in participants' knowledge and experiences (Green & Thorogood, 2018), in this case relating to Kahnawà:ke's food system and a community-identified priority issue. Participants were recruited using community advertising and by drawing on contextual knowledge of the core modeling team and KSDPP community partners to identify individuals/groups in Kahnawà:ke with unique perspectives of the food system. Community advertising methods included a one-hour radio interview, flyers posted in public spaces, local newspapers, community newsletters, and social media channels. Key community groups were identified and sent a flyer by email to share within their networks. Individuals identified from the existing networks of community partners received an invitational email and/or phone call. Individuals who responded affirmatively to an invitation were sent a consent form (Appendix 1) and invited to schedule an individual introductory meeting with the author to overview the study, eligibility, and their participation, address questions/concerns, and obtain individual written informed consent. Following consent, participants were enrolled in the study and prior to their first workshop, provided instructions to complete a brief, anonymous demographic questionnaire online (LimeSurvey) or in person (Appendix 2). Demographic information (gender, age group, and food system involvement) was used to guide ongoing recruitment methods and/or understand the diversity and completeness of participant samples.

2.2.1 Visioning Workshop Participants

15 to 30 community members representing diverse perspectives of the community food system were sought to participate in the visioning workshop. This number of participants was based on demographic and phenomenal variation to bring together a group that is informationally representative (as opposed to statistically representative of the population in the community) (Sandelowski, 1995) and manageable from a facilitative perspective. Diverse gender representation was sought with a key understanding that gender roles, responsibilities, complementarity, and power interact with all areas of the food system and are differently affected by food system change (Lemke & Delormier, 2017). Attention was given to ensuring youth participation, as it is important to include their voices in discussions relating to the future of their community. The participation of Elders was also sought, as Elders hold significant knowledge and wisdom, and their views are highly valued by Indigenous communities. Lastly, the participation of stakeholders representing key elements of the community food system was sought, including those who may be primary experiencers of food insecurity or participate in the food system as part of the broader socio-cultural and environmental context. The inclusion criteria for participants were to reside in Kahnawà:ke and provide written informed consent to participate. Youth participants aged 16 years or older were included.

2.2.2 Group Model Building Workshop Participants

One group of 10 to 25 community members with diverse roles, expertise, or interests in Kahnawà:ke's food system and/or the priority issue were sought for two group model building workshops. This number of participants was based on those commonly used in participatory modeling literature (Saryazdi et al., 2021; Voinov & Bousquet, 2010) and insights from Hovmand (2014) suggesting that small groups (less than 5) tend to lose the dynamics leading to

successful group model building outcomes and that as groups get larger, group interaction decreases. Like the visioning workshop, diverse gender, generational, and stakeholder representation was sought to capture the variability in participants' knowledge, experiences, and perspectives. Key stakeholder groups for group model building were determined in collaboration with the core modeling team and sought to include those with a relevant perspective on the priority issue the food system model (causal loop diagram) sought to address. To increase the opportunity for successful action resulting from the research, previous public health literature highlighted the importance of including key stakeholders, including community leaders, to help enable change following the research (Gerritsen et al., 2020). The inclusion criteria for participants were to reside in Kahnawà:ke, agree to participate in both group model building workshops, and provide written informed consent. Youth participants aged 16 years or older were included.

2.3 Data Generation Methods

The data generation method for this study was participatory visioning and group model building. Data generation was led by the core modeling team, who shared the responsibilities for the design, planning, recruitment, facilitation, and analysis of community group workshops (Hovmand, 2014; Richardson & Anderson, 1995). The team included five community members (DM, AS, AKM, VW, TM), the author (SU), an academic supervisor (TD) who is also Kahnawa'kehró:non, and a system dynamics consultant (KW). Each team member fulfilled important perspectives and roles in the design and convening of community workshops: substantive, methodological, logistical, and community voice (Ballard et al. 2020). Each member of the core modeling team provided their agreement to respect the confidentiality and privacy of workshop participants and their information (Appendix 3).

Data were generated in a series of community group workshops: one 3-hour visioning workshop and two (one 6-hour and one 3-hour) group model building workshops. Workshops were separated by one or more weeks and took place in private local settings in Kahnawà:ke chosen to emphasize accessibility for workshop participants. Each group model building workshop began with Ohénton Karihwatéhkwen, or Haudenosaunee Thanksgiving Address, followed by group introductions to bring our minds together, express gratitude, and help us get to know one another. Food and beverages were offered as a shared meal at each session. Community visioning and group model building workshops integrated general participatory visioning (Jojola, 2013; Umemoto, 2001; Walzer & Hamm, 2012; Wiek & Iwaniec, 2013) and group model building principles and structure (Gerritsen et al., 2020; Hovmand, 2014, Hovmand et al., 2015), guided by food system, food security, and food sovereignty concepts and literature. Visioning workshops were organized around a set of unstructured activities that allowed participants to step back and imagine a hoped future for the community food system, before naming community priorities. Group model building workshops were organized around a sequence of "scripts" or structured sequential group model building activities that engaged participants in co-creating a system model around a priority issue (also referred to as a reference mode or dynamic problem in systems dynamics work) (Hovmand, 2014; Hovmand et al., 2015). Workshop sessions were designed in collaboration with the core modeling team and described in a community workshops facilitation manual detailing group activities and time allotted, facilitation processes, and expected activity outputs (Appendix 4). Table 2 provides an overview of the core workshop activities, outputs, and data sources. The core modeling team worked together to ensure workshop activities were tailored to the local and cultural context and used

processes of respectful and equitable engagement to ensure that all voices were valued and heard. Core modeling team members shared roles during the workshops, acting as co-facilitators, process coaches, recorders/notetakers, and modelers. The author and system dynamics consultant held the lead facilitation/modeler roles during the group model building workshops.

2.3.1 Visioning Workshop

The main objective of the visioning workshop was to invite participants to explore a hoped future for Kahnawà:ke's food system that reflects community values and to identify community priorities. In small groups, the author and a community facilitator walked participants through the process of developing a vision using guided questions. Questions first prompted participants to reflect on the past and present states of the community food system to assist participants in understanding desired changes when later prompted to imagine a hoped future. For each question, participants were asked to reflect individually, record their reflections on sheet paper as words, statements, or drawings, and then share reflections in small groups. Groups were each asked to share out reflections to the full group one at a time. As participants shared out for each guiding question, we intended for a member of the core modeling team to begin clustering the sheet paper into themes on a wall. Given peoples' high level of engagement and abundance of insights on the topic, additional time was allocated to sharing vision reflections to facilitate a fruitful discussion without prematurely ending the exploration of visions for the food system. Instead, themes were generated using each data source post-workshop by the author. Workshop discussions involving the full group were audio-recorded and transcribed. Field notes documenting group discussions were recorded by a member of the core modeling team. Photographs of vision reflections were captured. Data sources generated during the

workshop are detailed in Table 2. Section 2.4 Data Analysis details the analysis process to generate vision themes.

The themes were given a flexible name and description and shared with the core modeling team for feedback and comments. Overall, themes aimed to reflect the group's collective vision and identified priorities for a hoped future for Kahnawà:ke's food system. The intent was to use a dot vote (Hovmand et al., 2015) in the workshop to identify the priority most important to the group, to ultimately be framed as a candidate reference mode (description of a dynamic problem) for subsequent group model building workshops. As workshop time was reallocated to sharing visions, this prioritization step was completed using an online ranking survey (Microsoft Forms) distributed by email. Participants were invited to rank priorities according to urgency and feasibility on a scale of 1 to 5, with 1 indicating low urgency or feasibility and 5 indicating high urgency or feasibility (Appendix 5). The priority ranking survey data were collected anonymously.

2.3.2 Group Model Building Workshops

As described in Chapter 1, group model building workshops followed a multistep process consisting of six sequential group activities, with outputs from each step contributing to the next. The core workshop activities included: Presenting the Food System Vision and Key Priority, Graphs Over Time, Connection Circles, Causal Loop Diagrams, Model Review, and Action Ideas. Activities were based on adaptable group model building scripts available from Scriptapedia (Hovmand et al., 2015). Scripts provide standard group activities that teams can use to design and facilitate group model building sessions tailored to a specific context (Hovmand, 2014). Group activities were completed in small groups followed by discussions with the full group. Group model building workshop discussions involving the full group were audio-recorded

and transcribed. Field notes documenting group discussions were recorded by a member of the core modeling team. Photographs of all workshop outputs were captured (i.e., graphs over time, connection circles, causal loop diagrams, and prioritized action ideas). Data sources generated during group model building workshops 1 and 2 are detailed in Table 2.

Group Model Building Workshop 1

The purpose of Presenting the Food System Vision and Key Priority was to review the vision and priorities identified during the visioning workshop and elicit feedback from the group, as well as to describe and ensure consensus on the priority issue (reference mode) that the food system model (causal loop diagram) would address. The goal of Graphs Over Time was to invite participants to brainstorm on different food system factors that influence or are influenced by the priority issue and how they have changed over time in Kahnawà:ke. Using guided questions and an example graph template (time on the x-axis and amount on the y-axis), participants created their own graphs showing the trajectories of factors over time. Graphs Over Time generated a list of candidate factors to be used for the next group task, Connection Circles. Working in small groups, Connection Circles invited participants to begin making causal links between the factors generated in Graphs Over Time. Using guided questions and a circle template to guide the linking of factors, connection circles helped participants explore linkages within the system. The linkages made between factors are the basis that guides the formation of feedback loops in the next step, Causal Loop Diagrams.

Causal Loop Diagrams were used to help participants expand on the linkages they mapped in Connection Circles. Working in small groups, this activity involved identifying directions of causality (positive or negative relationships) and connecting feedback loops (balancing, reinforcing) into causal loop diagrams to visually represent their understanding of the

system surrounding the priority issue. Drawing on factors and linkages that were identified from previous tasks, participants were guided by the core modeling team to create causal loop diagrams. Live with participants, the core modeling team began integrating each small group's causal loop diagram into one consolidated causal loop diagram. This task was completed by the author with support from the system dynamics consultant, and with feedback from the remaining members of the core modeling team between group model building workshops 1 and 2.

Group Model Building Workshop 2

The Model Review step served to validate the consolidated causal loop diagram and identified themes. During Model Review, the core modeling team presented the consolidated causal loop diagram in the workshop and participants were asked to review, discuss, and revise the causal loop diagram (factors, linkages) and identified themes (sub-systems and feedback loops) to confirm that their understanding, experiences, and insights emerging from earlier discussions had been accurately reflected in the causal loop diagram. With the causal loop diagram that was now validated by the participants, the Action Ideas activity asked participants to generate ideas on potential opportunities to intervene within the food system to impact the priority issue. Using guided questions, participants identified and shared opportunities for action, including where it would impact the system. Then using a priority matrix, participants prioritized actions according to feasibility (y-axis) and impact (x-axis). The result of this task was a list of prioritized opportunities for action within the current food system.

Table 2. Visioning and Group Model Building Workshop Core Data Sources

Activity	Description	Outputs	Data Sources
Creating a Shared Vision	Participants wrote vision reflections on paper as words, statements, or drawings and were invited to share in small and full group discussions. Participants and core modeling team worked collaboratively to identify themes.	• Vision reflections (53 sheets) • Visioning report	• Audio-recording (full group discussions) • Audio transcription (10 pages) • Fieldnotes (2 recorders) • Outputs
Priority Setting	Participants identified and ranked priorities for Kahnawà:ke's future food system.	• List of ranked priorities	• Numerical ranking for 8 food system priorities
Presenting the Vision and Key Priority	Participants reviewed the food system vision and priorities and ensured consensus on the priority issue the food system model would seek to address. Participants discussed how to represent trends in the priority issue.	• Graph depicting changes over time and hoped and alternate scenarios for the future	• Audio-recording (full group discussions) • Audio transcription (86 pages) • Fieldnotes (1 recorder) • Outputs of each group model building activity
Graphs Over Time	Participants brainstormed food system factors influencing the priority issue and how they have changed over time.	• Graphs of candidate factors for connection circles (26 sheets)	
Connection Circle	Participants mapped factors that influence the priority issue; linkages were drawn between factors. Participants completed connection circles in groups and discussed with the entire group.	• 1 connection circle per group (3 circles)	
Causal Loop Diagram	Participants were guided in expanding upon linkages in connection circles, adding positive or negative directionality, and connecting feedback loops. Participants completed causal loop diagrams in groups and discussed with the entire group.	• 1 causal loop diagram per group (4 diagrams)	
Model Review	Consolidated causal loop diagram, themes, and descriptions were shared with participants for feedback and revision.	• Validated causal loop diagram and themes	
Action Ideas	Participants identified opportunities for action, shared insights, and prioritized actions along a priority matrix.	• Prioritized opportunities for action (26 sheets)	

2.4 Data Analysis

The author led the analysis with the support of the core modeling team. During the visioning process, participants were asked guiding questions intended to elicit value-based, future-oriented reflections and narratives. Following the visioning workshop, audio recordings and vision reflections were transcribed into Microsoft Word for coding. Qualitative content analysis (Hsieh & Shannon, 2005) of participants' vision reflections and workshop transcripts commenced. In principle, a vision describes a desirable future state (Wiek & Iwaniec, 2013). Thus, the analysis began by deductively coding the workshop transcripts into segments that were meaningful and future oriented. The analysis then proceeded with an inductive approach that created codes from the concepts that were grounded in the participants' words. Analysis continued by searching for repetitions, similarities, and differences (Ryan & Bernard, 2003), resulting in codes being grouped into themes and given flexible descriptions. The themes and descriptions were reviewed by the core modeling team to provide suggestions and feedback. With participant consent, the summary report entitled *Envisioning the Future of Kahnawà:ke's Food System,* summarizing the methodology and results, was prepared and shared with participants by email (Appendix 6). Essentially, the report was a compilation of the workshop participants' shared vision for a food system that reflected their values and cultural responsibilities. The core modeling team appreciated the report as a valuable reference for how Kahnawa'keró:non envision the food system, food security, and food sovereignty. Participants were invited to provide suggestions, feedback, and refinements to ensure that the results in the visioning report accurately reflected the group's shared values-based vision for Kahnawà:ke's future food system. There were no suggested changes from the participant group. From the report, the priorities linked to the key components of the food system were selected as issues

upon which to focus. Priority ranking was completed using an online ranking (Microsoft Forms) survey (Appendix 5). Participants were asked to rank the food system priorities based on their ratings for both urgency and feasibility.

Following the second workshop, audio recordings were transcribed into Microsoft Word. Then, the author reviewed workshop fieldnotes, transcripts, and causal loop diagrams developed in small groups and ensured that all identified factors and linkages from the group discussions had been included in the causal loop diagrams (Hovmand, 2014). Assisted by workshop fieldnotes, transcripts, and original workshop outputs, the small groups' causal loop diagrams were integrated into one consolidated causal loop diagram capturing participant identified factors, relationships, and feedback loops. System dynamics software (Vensim PLE) was used to simplify integration, refine the causal loop diagram, and present the model in its visual form. The author conducted a qualitative content analysis (Hsieh & Shannon, 2005) to identify common themes in the consolidated causal loop diagram and transcripts.

Qualitative content analysis was iterative and used both inductive (from the words of the participants) and deductive (codes based on the conceptual frame) coding. Codes were then examined across the causal loop diagrams and transcriptions. Codes were grouped into themes to develop subsystems and feedback loops. Themes were labeled with and given a preliminary, flexible description. The refined causal loop diagram, with the initial themes and descriptions, was reviewed by the core modeling team to discuss and provide suggestions and feedback. Participants were then asked to review and revise the causal loop diagram (factors, linkages), identified themes (sub-systems and feedback loops), and descriptions at the beginning of the third workshop (Model Review) to ensure that their understanding and experiences were accurately reflected. Any changes suggested by participants were collaboratively incorporated

into the consolidated causal loop diagram. After the second group model building workshop, the author transcribed the action ideas into Microsoft Word. The author then organized the participants' list of prioritized actions into themes using deductive codes derived from the themes (subsystems and feedback loops) previously identified and validated in the participants' causal loop diagram. At each stage of data analysis, memos were used to record thoughts, ideas, feedback, and track decisions made during the entire analysis process (Creswell & Miller, 2000).

2.5 Rigour

This study used several strategies to enhance rigour including collaboration, member checking, triangulation, description, peer debriefing, and reflexivity (Creswell & Miller, 2000). Close collaboration and active involvement of community members (i.e., participants, core modeling team, ongoing engagement with the KSDPP community partners) occurred through all stages of this study as part of a community-based participatory research approach. Collaboration improves the quality and validity of research as it engages community perspectives, knowledge, expertise, and strengths which shape the research process and outcomes (Israel et al., 1998). That is, collaboratively developing, implementing, learning from, and acting on research with a community enhances its relevance, and the credibility and applicability of the results (Macaulay et al., 1999). Member checking with participants regarding the analysis and interpretation of all data sources was embedded in the design of the study and workshops through direct participation of participants in initial analysis steps, and in reviewing and refining the consolidated causal loop diagram, themes, and interpretations. Triangulation occurred by searching for convergence between workshop discussions (transcripts and fieldnotes) and outputs (i.e., graphs over time, connection circles, causal loop diagrams, and action ideas) throughout data analysis. A comprehensive description of all methodological considerations (e.g., sampling and recruitment

procedures, data generation and analysis procedures, etc.) has been included in the reporting of this study. The voices of community members and final workshop outputs have been integrated throughout the reporting of the results and findings using graphics and quotes. Peer debriefing has occurred on an ongoing basis with the KSDPP Research Team. Lastly, the author kept a journal during the entire research process to record an ongoing self-reflection of her personal values, assumptions, beliefs, biases, experiences, and relationships that may shape the research (Creswell & Miller, 2000). The author has made explicit her position and role as a researcher in the reporting of this study.

2.6 Ethical Considerations

This study was conducted in accordance with the KSDPP Code of Research Ethics (KSDPP, 2023) and the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans, Chapter 9 Research Involving the First Nations, Inuit, and Métis Peoples of Canada (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada, 2022). The study underwent review and approval by the KSDPP Research Team for scientific rigour and feasibility and the KSDPP Community Advisory Board for cultural relevance and benefit to the community (KSDPP Certificate of Approval obtained July 7, 2022). Ethics approval was also obtained from McGill University's Research Ethics Board (#22-08-076). Written informed consent was obtained from workshop participants once prior to the visioning workshop and once prior to the series of group model building workshops (Appendix 1). Participants were reminded that their participation in any of the research activities was voluntary and that they were free to withdraw at any time, for any reason, and without negative consequences. At the beginning and throughout all workshops, the author provided information and addressed all questions/concerns

regarding the research to assist participants in making informed decisions about their ongoing participation in the study. This research was considered minimal risk to participants (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada, 2022). The topics discussed and group activities were not expected to cause undue emotional, psychological, or physical stress. The research placed emphasis on the values, hopes, strengths, and assets of the community relating to the local food system. All information provided by participants was treated in confidence. Members of the core modeling team were required to sign a confidentiality agreement (Appendix 3), and participants were asked to respect the confidentiality of others in the workshops. To acknowledge participants' time to be involved in the study, they were offered an honorarium for each workshop they participated in ($25 for every 3 hours), as well as reimbursement for transportation and childcare expenses as needed.

2.7 Research Dissemination

Prior to disseminating research results in any format, review and approval was sought from the KSDPP Community Advisory Board and KSDPP Research Team in accordance with the submission and dissemination processes outlined in the KSDPP Code of Research Ethics (KSDPP, 2023). The feedback of community partners and any limits on disclosure (e.g., community knowledge or identity) have been acknowledged, respected, and integrated in the reporting and dissemination of results. All forms of knowledge sharing and dissemination uphold principles of anonymity, privacy, confidentiality, and respect for participants and the Kahnawà:ke community.

Dissemination activities are ongoing in collaboration with community partners. Results have been shared first within Kahnawà:ke via a community presentation to the KSDPP Research

Team and KSDPP Community Advisory Board. Further community knowledge translation activities are being developed. Results will also be shared externally for Indigenous, academic, and scientific audiences. The knowledge generated informed this thesis in fulfillment of a Master of Science in Human Nutrition at McGill University. Upcoming forms of dissemination are anticipated to include community presentations, additional summary reports, and graphic and audiovisual representations (e.g., interactive system model, causal loop diagram video), as well as manuscripts in scientific or peer-reviewed journals and presentations at scientific conferences or meetings.

Chapter 3: Visioning Findings (Bridge 2)

3.1 Introduction

This section provides a concise summary of the results generated from the food system visioning workshop and subsequent priority ranking survey conducted online (Microsoft Forms) by participants anonymously. The participant characteristics, key themes, and priorities briefly discussed here are based on those previously documented in detail in the community food system visioning report, available in Appendix 6. The primary objective of this summary is to outline the outcomes of the visioning workshop and report the findings of the priority ranking survey.

3.2 Participant Characteristics

The food system visioning workshop included a sample of sixteen participants including community members of both genders, across generations, involved in food security/sovereignty initiatives, food production/preparation, food distribution/assistance, food purchasing/consumption, research, and environment protection. This diverse sample helped to include varied perspectives on different dimensions of the community food system and to generate rich discussions and insights during the workshop.

3.3 Key Themes and Descriptions

Drawing upon the participants' vision reflections and full group discussions, qualitative content analysis identified several themes and subthemes describing the group's shared vision for Kahnawà:ke's food system, and which reflected community priorities for Kahnawà:ke's food system. The themes were: 1) community food system activities and resources; 2) knowledge sharing, education, and training; 3) social relationships; 4) community involvement and participation; 5) natural environment and ecosystems; 6) food security and health; and 7) culture

and heritage. Participants expressed a collective desire to cultivate a food system characterized by equity, health, cultural relevance, participation, social connectedness, and sustainability.

3.4 Community Food System Priorities

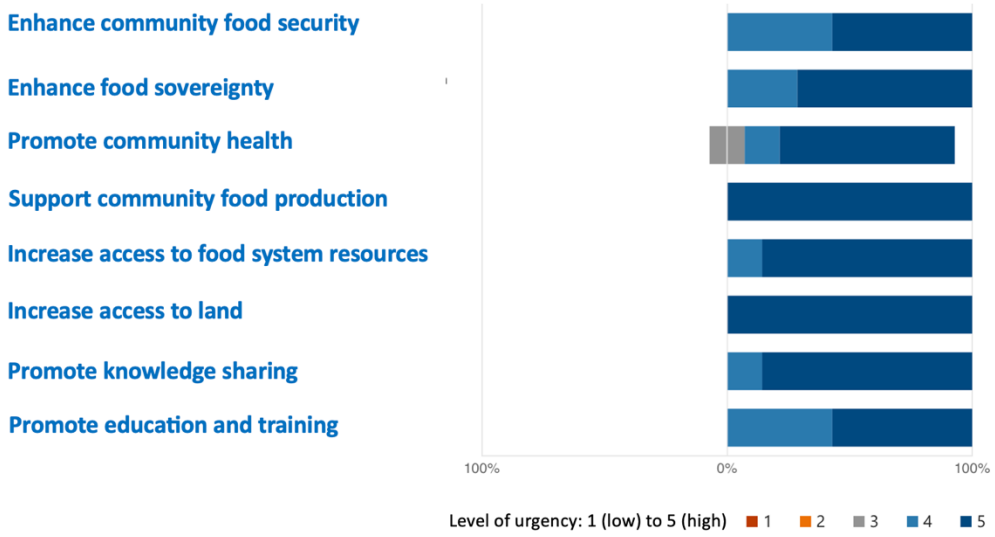
A priority ranking survey was administered online following the workshop sessions to further understand community food system priorities. The survey sought participants' perspectives on the relative importance of the identified priorities: 1) enhance community food security; 2) enhance food sovereignty; 3) promote community health; 4) support community food production; 5) increase access to food system resources; 6) increase access to land; 7) promote knowledge sharing; and 8) promote education and training. Participants were asked to rank these priorities based on perceived urgency and feasibility to inform the subsequent group model building process.

3.5 Results of Priority Ranking Survey

Examination of the survey data revealed several highly ranked priorities within the community food system. All seven participants who responded to the survey ranked “support community food production” and “increase access to land” at the highest level of urgency (Figure 2). These two priorities also corresponded with what participants perceived to be the least feasible (Figure 3). Ranking highest for urgency and lowest for feasibility was the rationale for selecting these two priorities as most important (relevant) for developing a systemic understanding using group model building. Notably, all food system priorities interconnect and interact in multiple ways. Discussions with the core modeling team acknowledged that while a single food system priority would be brought forward for the group model building workshops, the investigation was likely to touch on multiple, if not all, food system priorities identified from the visioning workshop. For example, community food production is dependent on access to

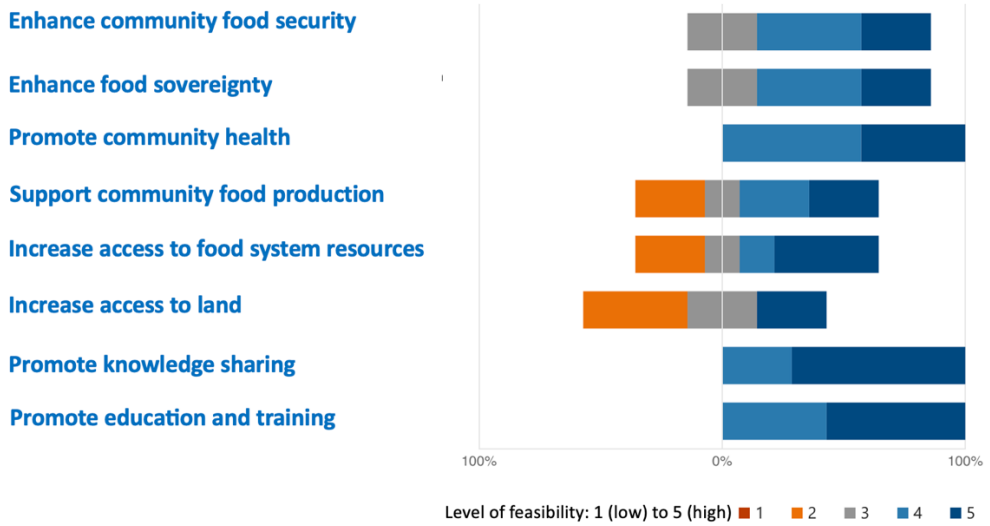
land, which was the other unanimously identified priority based on importance. Thus, community food production, encompassing diverse processes of producing local and traditional foods (e.g., gardening, planting, growing using greenhouses/hydroponics, animal farming, harvesting, hunting, and fishing), was nominated as the key priority proposed and accepted by participants as the reference mode for the group model building workshops.

Figure 2. Food System Priority Ranking by Perceived Urgency



Listed food system priorities ranked by urgency on a scale of 1 to 5. 1 indicates low urgency and 5 indicates high urgency. The X-axis shows the percentage of participant responses for each ranking. Graphic representation of Figure 2 adapted from Microsoft Forms Results Summary.

Figure 3. Food System Priority Ranking by Perceived Feasibility



Listed food system priorities ranked by feasibility on a scale of 1 to 5. 1 indicates low feasibility and 5 indicates high feasibility. The X-axis shows the percentage of participant responses for each ranking. Graphic representation of Figure 2 adapted from Microsoft Forms Results Summary.

3.6 Conclusion

In conclusion, the food system visioning workshop and priority ranking survey was an opportunity for engaged community participants to share insights into community priorities and values pertaining to Kahnawà:ke's food system. By engaging the diverse perspectives of participants, the visioning workshop served as a valuable problem scoping method for the subsequent group model building workshops. These findings highlight the significance of community engagement and collective visioning in shaping community food system planning and action.

Chapter 4: Overall Research Findings, Discussion, and Conclusion (Manuscript 2)

Mobilizing Action for Indigenous Food Security and Food Sovereignty Using a Community-Based Participatory Food Systems Approach

Shannon Udy and Treena Delormier

1. Introduction

Indigenous Peoples across the globe face significant challenges related to food security and food sovereignty, rooted in historical and ongoing processes of colonization and systemic inequities (Food and Agriculture Organization of the United Nations [FAO], 2021). Defined as ensuring consistent access to sufficient, safe, and nutritious food for an active and healthy life (FAO, 1996), food security is a pressing concern in Canada, as nutrition, health, and well-being are closely linked to food security status (Jessiman-Perreault & McIntyre, 2017; Kirkpatrick & Tarasuk, 2008; Melchoir et al., 2012; Men et al., 2020; Tait et al., 2018). Indigenous communities in Canada face heightened levels of food insecurity and health and nutrition disparities (Andersen et al., 2016; Batal, Chan, Fediuk, Ing, Berti, Mercille et al., 2021; Egeland et al., 2010; Rosol et al., 2008; Tarasuk & Mitchell, 2019; Willows et al., 2011).

Kahnawà:ke is a Kanien'kehá:ka (Mohawk) community situated on the south shore of the Saint Lawrence River. It is part of the Mohawk Nation and the Haudenosaunee Confederacy (Kahnawake Longhouse, n.d.). With approximately 8,079 residents (Indigenous Services Canada, 2023), Kahnawà:ke relies largely on external (market) food sources; however, there is a growing movement of Kahnawa'kehró:non (people of Kahnawà:ke) to reconnect with cultural food practices, reflecting cultural values, relationships, and responsibilities (Delormier et al., 2017).

Acknowledged locally as a key social determinant of health and community priority connected to Kahnawà:ke's greater food sovereignty movement, efforts to address food security are multifaceted, encompassing grassroots initiatives, community-driven research endeavours, and extensive health and social services infrastructure (Jacobs et al., 2020; Chan et al., 2019; Shukor, 2023). Kahnawà:ke's Food Security and Food Sovereignty Working Group emerged during the pandemic to support community mobilization efforts and provide emergency food services, while recognizing an ongoing need to address community food security and food sovereignty priorities (Jacobs et al., 2020). This collaborative research project grew out of the expressed need for a comprehensive approach to guide future food security planning and action. It was developed with community partnerships, including the Kahnawà:ke Schools Diabetes Prevention Program (KSDPP), a longstanding community-academic research and training centre with a high degree of community involvement and ownership that aims to prevent type 2 diabetes in Kahnawà:ke (Salsberg et al., 2017; Tremblay et al., 2018). This study sought to advance a values-based vision and shared understanding of Kahnawà:ke's food system by integrating Indigenous research and planning methodologies, community-based participatory research principles, and community-based system dynamics (Udy & Delormier, in press).

The necessity for this approach is underscored by the persistent inequities in food insecurity and health outcomes for Indigenous Peoples and the importance of community-led efforts to act upon this determinant of health. Despite various strategies, conventional food security approaches often overlook the significance of Indigenous Peoples' food systems, focusing primarily on individual or household-level access to market foods (Council of Canadian Academies, 2014; Loopstra, 2018). However, Indigenous Peoples' food systems hold an essential role in community food security, offering nutritionally dense and culturally significant

foods that promote both physical and spiritual health and well-being (Batal, Chan, Fediuk, Ing, Berti, Sadik et al., 2021ab; Blanchet et al., 2020; Egeland & Harrison, 2013; Kuhnlein, 2015).

In response to Indigenous Peoples' food security challenges, the concept and approach of Indigenous food sovereignty has emerged, advocating for community-led efforts to reclaim decision-making power within local food systems (Morrison, 2011; Settee & Shukla, 2020). Grounded in principles of self-determination and cultural revitalization, Indigenous food sovereignty offers a pathway towards addressing inequities and restoring connections to land, culture, and health (Blue Bird Jernigan et al., 2021; Grey & Patel, 2015; Sampson et al., 2021).

Indigenous food sovereignty essentially centres wholistic, systematic, and long-term intervention strategies (Gutierrez et al., 2023; Maudrie et al., 2021). A food systems approach offers a promising framework for understanding the complex interplay of factors shaping food security outcomes (Clancy, 2022; Nguyen, 2021). Unlike reductionist thinking pertaining to food system challenges that result in siloed approaches and isolated interventions focused on technical fixes (Ingram, 2011; Nguyen, 2018), a food systems approach acknowledges the interconnected nature of food systems, emphasizing the need for coordinated actions and long-term systemic change (Nguyen, 2018). While a food systems approach has gained traction at national and global levels (Brouwer et al., 2020), its application within Indigenous communities remains limited to a few known examples conducted in Australia (Brimblecombe et al., 2015) and New Zealand (McKelvie-Sebileau, Gerritsen et al., 2022).

One promising methodology within the realm of local food systems research is community-based system dynamics using methods and tools of group model building, a participatory approach rooted in systems science principles (Clancy, 2022; Wentworth et al., 2024). By engaging stakeholders in the co-creation of system dynamics models, group model building

facilitates collective understanding and exploration of complex issues (Hovmand, 2014). Moreover, it holds potential for aligning with Indigenous ways of knowing and doing (Browne et al., 2021; Goodchild et al., 2021; Heke et al., 2019; LaVallee, 2014, McKelvie-Sebileau, Pekepo et al., 2022) and fostering meaningful community engagement (McKelvie-Sebileau, Gerritsen et al., 2022; Gerritsen et al., 2020).

Despite growing interest in systems approaches within public health (Carey et al., 2015; Hernández et al., 2017; Zukowski et al., 2019), gaps remain in understanding how such methodologies can be effectively applied to address food security and food sovereignty with and for Indigenous communities. Thus, this study seeks to bridge this gap by proposing a community-based participatory food systems approach tailored to the specific needs and priorities of Kahnawà:ke (Udy & Delormier, in press). Community-based system dynamics projects typically involve three components: 1) problem scoping in which the issue to be modeled is identified; 2) core modeling team planning for the design and implementation of group model building workshops; and 3) group model building with community participants (Hovmand, 2014). Using participatory visioning as a novel and culturally relevant problem scoping method, initial engagement with community members to understand their vision for the food system guided us to address the key food system priority of community food production (Udy, 2024). By addressing two key research questions, namely: 1) from a systems perspective, what is Kahnawa'kehró:non's understanding of current food system priorities? and 2) what are opportunities for systemic actions impacting current food system priorities identified by Kahnawa'kehró:non?, we aim to contribute to the broader food sovereignty movement in Kahnawà:ke and advance community-driven strategies for community food security, nutrition, and well-being. The purpose of this paper is to describe the process and implementation of a

community-based participatory food systems approach in Kahnawà:ke and contribute to other communities' empowerment in their efforts towards food security and food sovereignty while honouring Indigenous knowledge and worldviews.

2. Materials and Methods

2.1 Design

A community-based participatory food systems approach bridging Western (i.e., community-based participatory research, community-based system dynamics) and Indigenous relational ways of knowing and doing was co-developed and implemented with community partners to explore Kahnawà:ke's food system and address the community-identified priority of community food production. The methodological approach developed for this study is described in Udy & Delormier (in press). A core modeling team, comprised of five community partners (DM, AS, AKM, VW, TM), two academic researchers (SU, TD), and a system dynamics consultant (KW), brought together unique perspectives and expertise in design, planning, facilitation, and analysis of two community group model building workshops in Kahnawà:ke (Ballard, 2020; Hovmand, 2014; Richardson & Anderson, 1995). The two workshops were held on separate days in July 2023. This study was reviewed and approved in accordance with the KSDPP Code of Research Ethics (KSDPP, 2023). The Research Ethics Board at McGill University approved the study (#22-08-076).

2.2 Participants

Participants were recruited using maximum variation purposive sampling to ensure diverse gender, generational, and stakeholder representation to capture the variability in participants' knowledge, experiences, and perspectives (Green & Thorogood, 2018). Recruitment methods included community advertising via radio, flyers, local newspapers, newsletters, and social

media. Additionally, key community groups representing diverse areas of the food system were identified and sent invitations to share within their networks. Individuals with interest or leadership in food security, food sovereignty, or food production were also identified through community partners' networks and received invitational emails or phone calls. All participants resided in Kahnawà:ke, were aged 16 years or older, and provided written informed consent to participate in this study. Following each workshop, participants were offered an honorarium (local gift card valued at $25 to $50, commensurate with workshop length) to thank them for their participation.

2.3 Data Generation

Data generation involved two group model building workshops led by the core modeling team: one 6-hour workshop and one 3-hour workshop, each held in private settings in Kahnawà:ke. Each group model building workshop began with the Ohénton Karihwatéhkwen, or Haudenosaunee Thanksgiving Address, to bring our minds together and express gratitude, as well as group introductions allowing us to get to know one another. Food and beverages were offered as a shared meal at each session. Workshop sessions integrated participatory visioning (Jojola, 2013; Umemoto, 2001; Walzer & Hamm, 2012; Wiek & Iwaniec, 2013) and group model building principles and structure (Gerritsen et al., 2020; Hovmand, 2014, Hovmand et al., 2015) and were guided by culturally relevant food system, food security, and food sovereignty concepts and literature. The sessions were organized primarily around a sequence of adaptable “scripts” (structured group model building activities) available from Scriptapedia (Hovmand et al., 2015) that engaged participants in the co-creation of a system dynamics model (causal loop diagram) of community food production. Each workshop session was discussed and designed in pre-workshop core modeling team meetings, helping to ensure the sessions were tailored to the

local and cultural context and following respectful and equitable engagement processes. During the workshops, team members shared roles (co-facilitators, process coaches, recorders/notetaking), with SU and KW leading facilitation and modeling (Hovmand, 2014; Richardson & Andersen, 1995). Workshop sessions and activities were described in detail in a community workshops facilitation manual and are summarized in Table 3. Workshop discussions involving the full group were audio-recorded and transcribed. Field notes were recorded by a member of the core modeling team. Photographs of workshop outputs were captured following each workshop to assist in later analysis.

Table 3. Group Building Workshop Core Activities, Outputs, and Data Sources

Activity	Description	Outputs	Data Sources
Presenting the Vision and Key Priority	Participants reviewed the food system vision and priorities and ensured consensus on the priority issue the food system model would seek to address. Participants discussed how to represent trends in community food production.	• Graph depicting changes over time and hoped and alternate scenarios for the future	• Audio-recording (full group discussions) • Audio transcription (86 pages) • Fieldnotes (1 recorder) • Outputs of each group model building activity
Graphs Over Time	Participants brainstormed factors influencing food production and graphed how they have changed over time.	• Graphs of candidate factors for connection circles (26 sheets)	
Connection Circle	Participants mapped factors that influence food production; linkages were drawn between factors. Participants completed connection circles in groups and discussed with the entire group.	• 1 connection circle per group (3 circles)	
Causal Loop Diagram	Participants were guided in expanding upon linkages in connection circles, adding positive or negative polarity, and connecting feedback loops. Participants completed causal loop diagrams in groups and discussed with the entire group.	• 1 causal loop diagram per group (4 diagrams)	
Model Review	Consolidated causal loop diagram, themes, and descriptions were shared with participants for feedback and revision.	• Validated causal loop diagram and themes	
Action Ideas	Participants identified opportunities for action, shared insights, and prioritized actions along a priority matrix.	• Prioritized opportunities for action (26 sheets)	

2.4 Analysis

Data analysis was led and conducted by SU with support from the core modeling team. Following the first workshop, field notes, transcripts, and causal loop diagrams developed by small groups were reviewed and integrated into one consolidated causal loop diagram capturing participant identified factors, relationships, and feedback loops. System dynamics software (Vensim PLE) was used to simplify the integration and refinement of the causal loop diagram and for the presentation of the model. Qualitative content analysis (Hsieh & Shannon, 2005) was conducted using an iterative process of inductive (from the words of participants) and deductive (based on conceptual framing) coding. Codes were examined across the causal loop diagrams and transcripts and grouped into themes (subsystems and feedback loops). Themes were given an initial name and flexible description. The consolidated causal loop diagram, initial themes, and descriptions were reviewed by the core modeling team to provide suggestions and feedback. Participants were asked to review, discuss, and revise the causal loop diagram at the beginning of the second workshop (Model Review) to ensure that their understanding and experiences had been accurately reflected. Any changes suggested by participants were discussed and incorporated. After the second workshop, participant identified priority actions were organized deductively according to the themes of the causal loop diagram. Collaboration, member checking, triangulation of data sources, description in reporting, peer debriefing with the core modeling team and community partners, and researcher reflexivity were employed to enhance rigour and ensure the validity and credibility of the research findings (Creswell & Miller, 2000).

3. Results

3.1 Participants

Eleven community members participated in the group model building workshops. Most participants attended both workshops; however, two people attended only the first, and three people attended only the second. Workshop participants provided anonymous responses to an optional demographic questionnaire at the beginning of each group model building workshop. Participants answered questions about their age, gender, and main involvement in Kahnawà:ke's food system. Please see Table 4 for the demographic characteristics of workshop participants.

Table 4. Characteristics of Group Model Building Workshop Participants

Characteristics	Number	%
Age (years)		
16-30	3	27
31-45	2	18
46-60	3	27
61-75	2	18
76 or older	1	9
Gender		
Female	8	72
Male	2	18
Prefer not to answer	1	9
Primary involvement in Kahnawà:ke's food system		
Food security/sovereignty initiatives	4	36
Food production/generation	6	55
Research	1	9
Environment	1	9
Governance	1	9

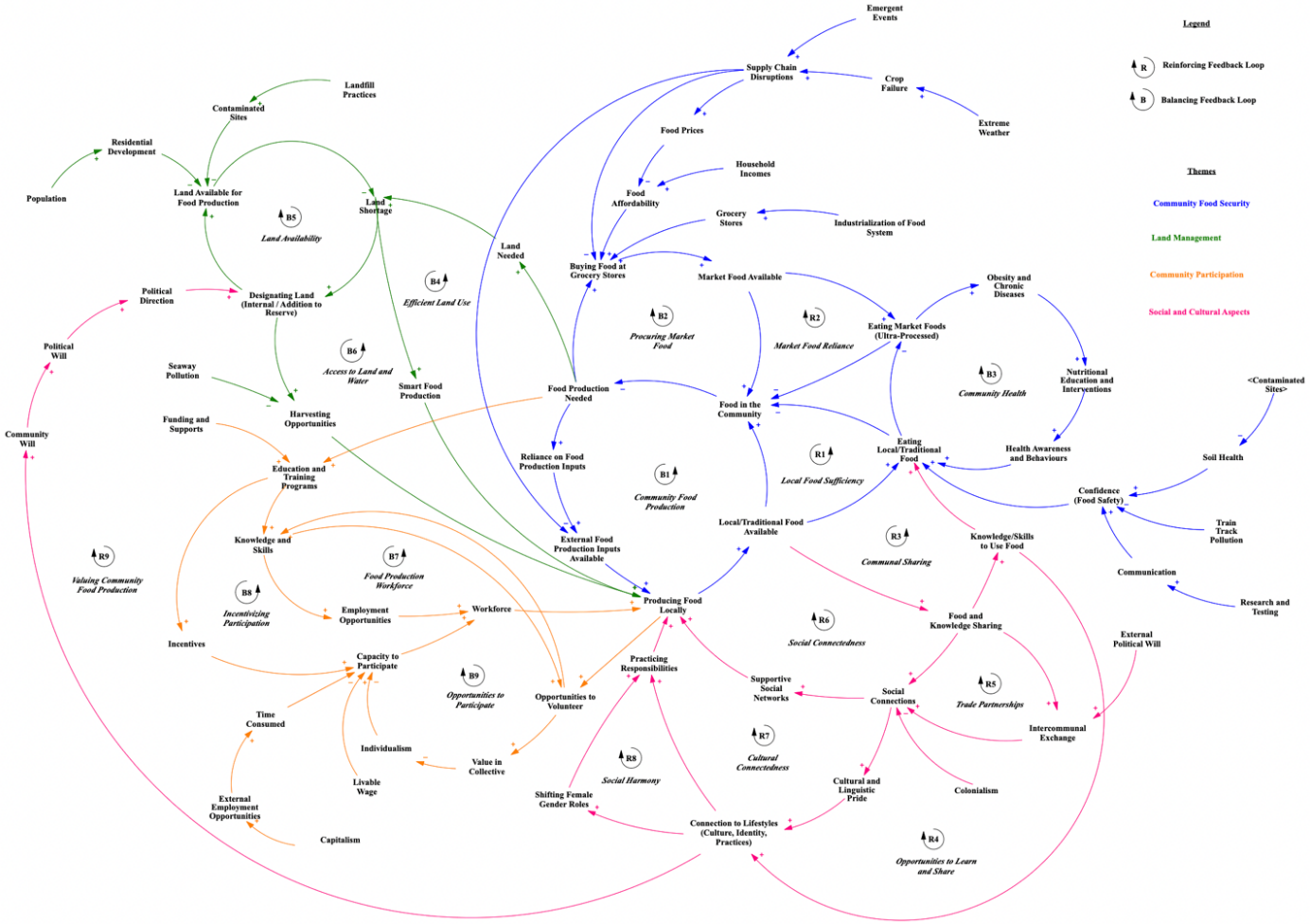
3.2 Group Model Building Results

Figure 4 shows the final systems model of Kahnawà:ke's food production system which was constructed from four smaller group causal loop diagrams. Participants initiated the synthesis of the initial causal loop diagram live during the first group model building workshop. The core modeling team completed the causal loop diagram post-workshop. Participants then

reviewed the completed initial systems model during the second group model building workshop. It was revised based on their feedback to produce the final consolidated causal loop diagram.

The causal loop diagram is comprised of nine reinforcing feedback loops (indicated by R in Figure 4) and nine balancing feedback loops (indicated by B in Figure 4) of factors influencing community food production. Reinforcing feedback loops compound the initial direction of change, whereas balancing feedback loops counter the initial direction of change.[1] Feedback loops are organized into four subsystems indicated by different colours in Figure 4. Subsystems in the causal loop diagram include: (a) Community food security (blue arrows); (b) Land management (green arrows); (c) Community participation (orange arrows); and (d) Social and cultural aspects (pink arrows).

Figure 4. Consolidated Causal Loop Diagram of Kahnawà:ke's Food Production System



[1]Arrows with positive polarity (+) represent a relationship in which an increase in a factor causes an increase in the receiving factor, or a decrease in a factor causes a decrease in the receiving factor. Arrows with negative polarity (-) represent a relationship in which an increase in a factor causes a decrease in the receiving factor, or a decrease in a factor causes an increase in the receiving factor.

3.2.1 Theme 1: Community food security

The first subsystem focuses on community food security (see B1-3 and R1-2 in Figure 4). Participants described two main ways of obtaining food in the community—producing food locally and buying food from grocery stores. "Community food production" is a balancing feedback loop (B1) that describes how local/traditional foods contribute to the level of food in the community available for consumption and drive the need to produce food locally. As the need to produce food increases, community reliance on food production inputs (e.g., seeds and hay for animals) increases. Participants described how local food production can be restricted by decreases in the availability of external food production inputs, which are affected by disruptions in the external supply chain. These disruptions, the result of extreme weather, crop failures, or emergent events, were understood by participants to increase food prices and decrease food affordability, particularly for low- and single-income households. Participants referred to community food production as a broad concept encompassing the many diverse processes of producing local and traditional foods.

> *"Producing food, probably we're talking mostly about gardening but there's also hunting and foraging and all those things." (Aianóhon Kaylia Marquis)*

Community food production reinforces local/traditional food consumption, as seen in the loop "local food sufficiency" (R1). "Procuring market food" is a balancing feedback loop (B2) that describes how market (store-bought) foods also contribute to the level of food in the community available for consumption. As community food production increases the availability of local/traditional foods, the level of market food that people purchase and consume is thought to decrease, as described by the reinforcing feedback loop "market food reliance" (R2).

Participants expressed a strong preference for supporting local food sufficiency, especially in the context of climate change.

"The town wants to be on their own, not have to depend on IGA or any outside entity, and what we want is to be healthy and independent overall." (Karonhianó:ron Curotte)

"It's a reality, climate change is happening, food is going to become more challenging to come by throughout the next years... so putting supports in place now will be really, really important." (Lynn Jacobs)

"Hopefully the community grows along with us and becomes more reliant on locally produced food, and we'll get more volunteers to come in and/or employment in that field to produce more to eat." (Douglas Lahache)

"Community health" is a balancing feedback loop (B3) that describes how the consumption of market foods, particularly ultra-processed foods, contributes to the development of obesity and nutrition-related chronic diseases, including type 2 diabetes. High levels of obesity and chronic disease were thought to increase the demand for nutrition or health-related education and interventions that enhance peoples' health awareness and behaviours, promote the consumption of nutritious foods, and thus improve community health. Participants described local/traditional foods as healthier than market foods; however, they highlighted concerns and a lack of confidence in the safety of local foods and water due to environmental contamination and pollution. Ongoing research and testing to ensure and communicate food safety information was described by participants as essential to rebuilding community confidence in local/traditional food consumption.

"We do have a garden but…I'm just afraid of maybe two years down the line, finding out my land is just covered in pollutants that could cause cancer, and I just don't want

to…fall victim to that. So, even drinking water from my own tap, I'm kind of hesitant about it." (Karonhianó:ron Curotte)

3.2.2 Theme 2: Land management

The second theme focuses on land management (see B4-6 in Figure 4). Participants described the significance of land in meeting community food production needs. "Efficient land use" is a balancing feedback loop (B4) that describes how the level of food production needed drives the need for land, which in current short supply, intensifies Kahnawà:ke's present land shortage. As explained by participants, the community may respond to the land shortage by increasing smart food production techniques, such as vertical farming, hydroponics, and other innovations that make efficient use of land space to maximize local food production. Participants also described how the shortage of land could be addressed by increasing land availability through internally designating land for food production and/or by addition(s) to the reserve, as seen in the balancing feedback loop "land availability" (B5).

"We need land, and we need land to be designated [for food production and harvesting], but we don't have that. So, we have to make sure that whatever it is that we do with our limited land, it has to be innovative, smart, and sustainable." (Lynn Jacobs)

Participants indicated that the availability of land and water for food production decreases with increasing residential development driven by population growth, as well as the increasing number of contaminated sites resulting from harmful landfill practices. Political will was thought to play a pivotal role in the community's overall political direction concerning land designation and use.

"If we have good political will, we'll be able to get that land designation internally. And that can be done using the existing land base or it can be achieved through additions to reserve with sufficient political will." (Benjamin Green-Stacey)

Participants indicated that internal designation of land for food production increases access to land and water, and thus promotes land- and water-based harvesting opportunities that contribute to community food production, as seen in the balancing feedback loop "access to land and water" (B6).

3.2.3 Theme 3: Community participation

There was significant discussion around community participation in food production (see B7-9 in Figure 4). Participants described how the development of a workforce dedicated to producing food is required to meet community food production needs. "Food production workforce" (B7) is a balancing feedback loop that describes how education and training programs build knowledge and skills for food production, create employment opportunities, and generate a workforce dedicated to community food production. Participants indicated that education and training programs require adequate funding and support for program development, implementation, and sustainability. Further, direct funding and support to people as they pursue such programming is thought to enhance individuals' capacity to participate, as depicted in the balancing feedback loop "incentivizing participation" (B8). Factors including capitalism, limited time, and insufficient wages were thought to increase people's propensity to opt for employment opportunities external to Kahnawà:ke and/or the food system, thus influencing community participation in a workforce for food production.

"Agriculture is difficult. It's hard work, it's not lucrative, and it's not something that our community is used to anymore…It's a mind frame change and we need incentives to get there." (Lynn Jacobs)

"What we need is good incentives, financial supports, education, etc., to really get people to buy into the food system, to buy into…food security, to contribute to the overall outcomes that we're hoping to achieve."(Benjamin Green-Stacey)

Participants also described the essential role of volunteerism in enhancing participation in community food production activities, as depicted in the balancing feedback loop "opportunities to participate" (B9). Food production volunteer opportunities were thought to reinforce collectivism as a community value and decrease individualistic mindsets, which are believed to diminish people's capacity and desire to participate in community food production. Volunteering provides opportunities for people to build their knowledge and skills in food production, and likewise, building knowledge and skills creates opportunities for application in volunteering.

"Volunteerism at a young age sets you up for your entire life. You know what hard work is and you know the benefits of assisting somebody for free." (Douglas Lahache)

"The community needs to…consider the value that it brings to the community in the long term to offer more volunteer opportunities, which would have a positive impact on moving away from individualism." (Lynn Jacobs)

3.2.4 Theme 4: Social and cultural aspects

The final theme focuses on social and cultural aspects of community food production (see R3-9 in Figure 4). "Communal sharing" is a reinforcing feedback loop (R3) that describes how local food production increases the availability of traditional/local food within Kahnawà:ke, thereby facilitating food and knowledge sharing. Participants explained how food and knowledge

sharing builds peoples' knowledge and skills to use food (e.g., food processing, preparing, and understanding the cycle of ceremonies), which then promotes its consumption. "Opportunities to learn and share" (R4) describes how food and knowledge sharing outside of formal education and training reinforces lifestyles rooted in culture, identity, and practices.

> *"The more opportunities you have, you can learn from it. So, you can up your knowledge. You have a better lifestyle. You can understand how to harvest better." (Lynden Moses)*
>
> *"If you're approaching things from the perspective of traditional food production, preparation, growing, sharing, all those things…it's necessary that you're more familiar with and learning about the cycle of ceremonies and how that is connected to our food production…There's a knowledge increase there as well, not just pride or lifestyle, but the knowledge itself and connection." (Aianóhon Kaylia Marquis)*

Participants noted that communal sharing of food and knowledge enables intercommunal exchange with nearby Indigenous communities, as depicted in the reinforcing feedback loop "trade partnerships" (R5).

> *"Information sharing and even the food trade has occasionally been explored, but it probably is a pathway that we should intentionally strengthen." (Aianóhon Kaylia Marquis)*

In tandem with communal sharing is "social connectedness" (R6), a reinforcing feedback loop that describes how local food production creates opportunities to strengthen social connections.

> *"No matter where you went, you were never hungry because…you would go to somebody's house after school, you would get a sandwich or a pot [of soup]. There was*

always food. So that was…a very important community social connection with food." (Anonymous Participant 1)

Social connectedness was thought to increase cultural and linguistic pride and reinforce lifestyles that include practicing responsibilities of planting and producing traditional food crops, as depicted in the reinforcing feedback loop "cultural connectedness" (R7).

"Identity, cultural, and linguistic pride…that's been increasing over time, and I think that's influencing people's feeling to want to practice their responsibilities to take care of our food crops." (Anonymous Participant 2)

Participants shared how colonialism has severed social connections that once ensured people worked together to protect and promote traditional food production and consumption and support ways of living rooted in Kanien'kehá:ka culture and identity. Participants also described how practicing cultural responsibilities of planting and producing traditional food crops has decreased due to shifting female gender roles. Over time, female roles have moved from being responsible for food production to taking on domestic work and/or paid employment. Gender roles in food production are thought to be a component of community "social harmony" (R8) and balance, ensuring food is a communal responsibility.

"There was a balance we're told, right? The harmony. And it wasn't that…women did this, and men did that. You could do whatever would have to be done but there was an understanding of responsibilities." (Anonymous Participant 2)

Participants discussed the pivotal role of cultural connectedness in reinforcing community will for food production, as depicted in the reinforcing feedback loop "valuing community food production" (R9). Increasing community will for food production was thought

to drive political will and align Kahnawà:ke's political direction with shared values and attitudes surrounding community food production as a key priority.

> *"I think the cultural connectedness piece…influences the decisions you make overall, right? It colours everything. Not just my garden or not just going to one festival or something…pulling it back further, it's actually more a value shift." (Aianóhon Kaylia Marquis)*

3.2.5 Action Ideas

Participants were invited to share ideas about potential opportunities to intervene within the food system to impact community food production. Guided by the concept of leverage points (Meadows, 1999), participants shared action ideas, indicating where each action was perceived to create change in the food production system using the consolidated casual loop diagram. Twenty-five unique action ideas were proposed (Table 5) according to the subsystem and feedback loop(s) that each action most directly influences. Participants also prioritized actions along a priority matrix according to feasibility (y-axis) and impact (x-axis) (Figure S1 [Appendix 6]). Most actions fell within the "hard to do and high impact" and "easy to do and high impact" quadrants. Funding to support community participation in food production through education and training programming was identified as the most feasible and impactful. Designating land for food production was identified as the second most impactful but least feasible.

Table 5. Action Ideas Proposed by Group Model Building Participants

Theme	Feedback Loop	Action Ideas
Community food security	Community food production (B1) Procuring market food (B2) Community health (B3)	• Create inventory of current community food production activities to build awareness. • Food packaging (logo) for food produced locally by Kahnawa'kehró:non to promote local food system. • Increase access to staple foods for all community households in local stores. • Support health promotion and (chronic) disease prevention through community health plan which identifies Indigenous and healthy food systems as a determinant. • Increase awareness on the value of food and food systems as integral to health/well-being, identity (Kanien'kehá:ka), rematriation, and decolonization.
Land management	Efficient land use (B4) Land (water) availability (B5)	• Vertical gardening to densify greenhouse area to increase food production yields. • Create policy for all new community plants (trees, landscaping) to be Indigenous and promote food production. • Identify, protect, and promote land currently in community for food production (lawns, yards, school yards, common spaces). • Urban planning with the goal of development for food production (e.g., food-bearing plants, nut trees, berries instead of fences, etc.). Designate agriculture lands along Highway 730 for food production.
Community participation	Food production workforce (B7)	• Funding for the development of (online) food production education and training programs. • Communication about desire for and availability of education, training, and mentorship. • Workforce development including identifying formal leadership for the community food system and operational commitment to food projects. Includes building or enhancing leadership and workforce capacity via education, training, and mentoring. • Create stage programs for work study programs (local business development and social assistance programs).

Theme	Feedback Loop	Action Ideas
	Incentivizing participation (B8)	• Support workforce development through incentives such as funding and full-time employment post-graduation. • Offer small-scale introductory food production activities to enhance interest in community food production.
	Opportunities to participate (B9)	• Summer student/volunteer program for youth/adults to participate in farming to enable education and skill sharing. • Food production workforce/leadership to plan garden and community engagement, education, field trips from schools (mainstreaming) (e.g., community garden shares, volunteering for experience and food, surplus foods sold/traded).
Social and cultural aspects	Communal sharing (R3)	• Create community seed library accessible to community members with database of seed information and inventory. • Designate a common space for a weekly farmers' market.
	Opportunities to learn and share (R4)	• Communication about desire for and availability of education, training, and mentorship. • Create educational pamphlets for community food basket (e.g., meal ideas, tips, seed saving). • Educational program and manual for everyone to plan, preserve, and store.
	Trade partnerships (R5)	• Create agreements/contracts with neighboring farms to produce foods.
	Valuing community food production (R9)	• Develop a community food policy that values tionhnhéhkwen (traditional foods), wholistic well-being, seven generations thinking, people, and all living things. • Increase awareness on the value of food and food systems as integral to health/well-being, identity (Kanien'kehá:ka), rematriation, and decolonization.

4. Discussion

This research presents the results of co-designing and implementing a community-based participatory food systems approach to support community food security and Indigenous food sovereignty planning in the Kanien'kehá:ka (Mohawk) community of Kahnawà:ke (Udy & Delormier, in press). It was guided by the following research questions: 1) from a systems perspective, what is Kahnawa'kehró:non's understanding of current food system priorities? and 2) what are opportunities for systemic actions impacting current food system priorities identified by Kahnawa'kehró:non? The first part of this study engaged diverse community stakeholders in envisioning a future food system that expressed community values and food system priorities. Food production, selected by participants as the priority for further analysis within the food system, encompasses diverse processes involved in producing local and traditional foods. Bridging Indigenous relational ways of knowing and doing with Western (community-based participatory research, community-based system dynamics) methodologies created a space for diverse community members to come together and explore the factors, relationships, and interconnections structuring community food production. The resulting consolidated causal loop diagram represents a local understanding of the dynamics of food production in Kahnawà:ke. It presents an integration of community perspectives, knowledge, and experiences serving as a tool to explore community proposed action ideas for desired food system change. Overall, findings provide insights into several important dynamics shaping community food production, food security, and Indigenous food sovereignty in Kahnawà:ke. The results move beyond a narrow focus on individual factors influencing community food system priorities by bringing to the forefront the complex interplay of multiple factors that shape food security and food system outcomes over time to assist in identifying coordinated actions to address underlying causes.

The consolidated causal loop diagram revealed the balance between local food production and market food access in Kahnawà:ke. At the time of this study, Kahnawà:ke residents relied on a combination of local/traditional and market foods to meet community food needs. In other words, the more the community produced to meet food needs, the less reliant they were on accessing market foods, and vice versa. Participants' understanding of community food production went beyond its common conception of a linear value chain (FAO, 2021). Significantly they unanimously expressed community food production as expressing cultural identity and self-determination. Participants identified culturally based food production practices, rooted in traditional knowledge systems, as fostering social and cultural connections through food and knowledge sharing, while reinforcing cultural responsibilities and social harmony. For example, participants explained how the Ohénton Karihwatéhkwen (the words that come before all matters) is said to bring together the minds of those gathered through expressing gratitude for the gifts of creation. It teaches about the reciprocal caring relationship people hold with creation, including Haudenosaunee communal responsibilities to take care of traditional food crops (tionhnhéhkwen–they sustain our lives), by planting them, saving their seeds, and ensuring this life sustaining relationship continues for future generations. This finding aligns with existing food sovereignty literature and highlights the importance of using culturally based food security approaches that strengthen and nurture social relationships and reinforce Indigenous identities (e.g., Cidro et al., 2015; Decaire, n.d.; Delormier et al., 2017; Delormier & Marquis, 2018).

The findings revealed that participants understand that local food production fosters self-sufficiency and reduces dependence on external markets. However, disruptions in community food production due to external factors such as climatic and emergent events that influence the availability of food production resources were conceived as threats to food security. Kahnawà:ke

has demonstrated capability in responding to community crises. Indeed, experiences in the recent past were cited to support this understanding. For example, during the 1990 Oka Crisis, all access points to the community were blocked by provincial police, and later the Canadian army, in response to Kahnawà:ke warriors blocking a bridge within their community which connects the south shore to the island of Montréal (Meng, 2020). This action was meant to stop the armed invasion of Kanehsatake, a nearby sister Mohawk community, to remove barricades they erected to protect their sacred lands from the illegal development of a golf course and condominiums for the neighbouring town of Oka. Throughout the ensuing 78-day standoff, Kahnawà:ke mobilized to safeguard their self-determination and ensure access to food for all community members. During the 1998 ice storm (Bonikowsky & Block, 2016), Kahnawà:ke was one of the few communities that did not declare a state of emergency because the community's emergency preparedness effectively mobilized to ensure everyone had adequate food and safe lodging. A recent example was the COVID-19 pandemic, where measures to protect the community through restrictions on social gatherings and travel reduced access to food retailers external to the community. These events are cited as important reminders of the community's vulnerabilities to food insecurity (Delormier et al., 2017; Jacobs et al., 2020), and identify a need to address long-term food security in Kahnawà:ke. Aligning with existing evidence from Kahnawà:ke (Chan et al., 2019), participants in this study recognized the practical benefits (e.g., convenience, availability, variety) of market food systems in supplementing their diet with items not readily available locally. However, participants were acutely aware that market food systems simultaneously expose the community to challenges and vulnerabilities, such as price fluctuations, dependence on external suppliers, and ultra-processed foods that drive unhealthy dietary patterns and increase the risks of chronic diseases and obesity.

Several challenges common to food systems that are connected to local food sufficiency were raised by participants, including climate change impacts, biodiversity loss, food waste/loss, barriers to the intercommunal exchange of food and resources, and power dynamics affecting individual and community decisions on land, resources, and development (FAO, 2021; High Level Panel of Experts on Food Security and Nutrition [HPLE], 2020). Owing to the diversity and complexity of food systems, the ways such factors interconnect and interact with each other to influence food security and food system outcomes are highly context dependent (HPLE, 2020). For example, biodiversity is threatened by housing and industrial development encroaching on lands where traditional plants and medicines grow in Kahnawà:ke. Efforts to strengthen the local/traditional food system are widely supported in Kahnawà:ke as a means of providing nutritious food and preserving cultural identity and self-determination. Participants in a local food sovereignty initiative agreed or strongly agreed that participating in the initiative: helped improve mental well-being (74%) and was a valuable cultural experience (63%) (Shukor, 2023). However, as current avenues of locally producing food rely partly on external markets to provide food production inputs, there is a need for further research to understand the challenges, vulnerabilities, and opportunities of balancing market and local/traditional food systems in Kahnawà:ke to promote food security and resilience.

Findings further highlight the role of community food production in supporting community health and nutrition by providing minimally processed and nutrient dense foods. Participants indicated that local and traditional foods were perceived as more nutritious and natural when compared to market foods, in part due to understanding where and how they were produced and prepared. These findings on the perceptions of local/traditional foods corroborate previous research from the Québec/Labrador region, which included data from Kahnawà:ke (Chan et al.,

2019). It indicated that traditional foods were important contributors to nutrient intakes (e.g., protein, iron, zinc, copper, vitamins D, B12, and niacin), even in the small quantities that they were consumed (26.1 g/person/day for women and 21.2 g/person/day for men). Indeed, three-quarters of Kahnawà:ke participants reported wanting to consume more traditional food (Chan et al., 2019). Though market foods were recognized to enhance dietary diversity and food security through community food access, participants perceived some foods as a threat to health and nutrition. Participants elaborated on how the industrialization of the food system and the abundance of grocery stores introduce ultra-processed foods, which contribute to nutrition-related chronic diseases and obesity within the community. These perceptions of market food quality are also supported by previous research indicating that market foods increase intakes of saturated fat and sodium, emphasizing the importance of promoting local and traditional food consumption and preparation for health and nutrition (Batal, Chan, Fediuk, Ing, Berti, Sadik et al., 2021b; Chan et al., 2019). Through community governed research and intervention activities focusing on school-aged children and families, the KSDPP has contributed to shifting social norms for healthy eating and wholistic wellness (Bisset et al., 2004; Macaulay et al., 1997). As well, Kahnawà:ke's extensive health and social service resources support community health and address relevant health issues, including type 2 diabetes prevention. Overall, the findings of this study highlight the need for more focused efforts and community-led initiatives to understand community preferences and priorities concerning local/traditional food and market food sources.

The consolidated causal loop diagram revealed the significance of building and transmitting knowledge and skills for food production through formal and informal education and training. Findings corroborate existing research from Kahnawà:ke that suggested educational, economic, and cultural benefits of transmitting knowledge and skills through food production practices

(Delormier et al., 2017). Thus, culturally appropriate education and training programs, integrating traditional knowledge with modern and sustainable technology and practices, geared toward bolstering a food production workforce, are essential to ensuring local food production capacity to meet community food needs. Food production employment opportunities may contribute to local economic development by creating jobs and income-generating activities within the community. Participants explained how, under the influence of capitalism, food production activities have decreased over time as community members have increasingly opted for higher paying employment outside of food production and/or the community. Volunteer and other informal learning opportunities were also understood to expand food production activities while providing inclusive and accessible pathways for people of all ages to connect and share knowledge, skills, and responsibilities for producing food, thereby reinforcing the value of collectivism. Previous research from Kahnawà:ke demonstrates the need to ensure adequate and long-term funding and program support (Delormier & Marquis, 2018), as well as offering fair wages to incentivize employment in food production.

The consolidated causal loop diagram revealed the multifaceted subsystem of land management shaped by historical legacies of land loss through illegal sales, current political dynamics governing land use, and environmental considerations, including the integrity of soil and agricultural lands. Several historical issues discussed by participants, including the creation of land allotments during the Wallbank's Survey (Ruek, 2013) and the contentious construction of the Saint Lawrence Seaway (Bonaparte, n.d.; Phillips, 2000), have changed the relationships and way people use and access land, the river (Kaniatarowanenneh), and water for food production. Ongoing residential development for the growing population and landfill practices continue to threaten access to Kahnawà:ke's suitable agricultural lands. At the time of this study,

policy and governance hold a significant role in shaping land management, land use, and titleholder decisions. The Mohawk Council of Kahnawà:ke holds administrative responsibilities for overseeing land management; however, competing priorities pertaining to land pose challenges (Alfred, 1995). In agreement with existing literature, participants elaborated on how decision-making regarding land designation and use must balance residential and economic development, environmental conservation, and community food production (Delormier et al., 2017). However, these findings extend previous literature by emphasizing how strong community will, rooted in collective responsibilities for food production, among other factors, may influence Kahnawà:ke's political direction in shaping land management decisions. In January of 2023, the Mohawk Council of Kahnawà:ke announced a newly created sustainable development portfolio which includes food security/agriculture, reflecting its importance as a community priority (Mohawk Council of Kahnawà:ke, 2023). Participants acknowledged political and community will as two systemic factors that require further elaboration as it is unclear under what conditions the community may shape the political decisions needed to designate land for food production.

The action ideas generated by participants revealed the importance of understanding the complexity of the system shaping food production in Kahnawà:ke. Many action ideas, such as food policy that could reinforce the value of community food production, and investments in food-related mentorship, education, and training, may not seem to directly enhance food production in the absence of the wholistic understanding generated by this study. The results of this study extend previous food sovereignty literature (Delormier et al., 2017; Delormier & Marquis, 2018) by capturing the dynamics specific to food production in Kahnawà:ke. As such,

the findings enabled participants to suggest ways to intervene touching all identified subsystems structuring community food production (Table 5).

A food systems approach to food security has been conducted in a remote Australian Indigenous community context (Brimblecombe et al., 2015). The participatory process and tool used had limitations including an inability to elucidate linkages and feedbacks between various areas of local food systems. Authors of this work suggested group model building as a systems approach to guide further work in this area (Brimblecombe et al., 2017). They recognize that participatory, structured approaches can promote collaboration between food system sectors and community groups (Rogers et al., 2018). Group model building has demonstrated the potential to align with Indigenous ways of knowing, being, and doing when culturally adapted (Browne et al., 2021; Heke et al., 2019; LaVallee, 2014). A recent study using group model building in Hawke's Bay, New Zealand demonstrated meaningful community engagement in a manner consistent with an Indigenous (Māori) worldview by collaboratively mapping the food system and identifying interventions to improve children's nutrition (McKelvie-Sebileau, Gerritsen et al., 2022). Our study contributes to the existing literature by providing a model operationalizing a food systems approach in respectful and collaborative research with one Indigenous community for the purpose of food security and food sovereignty action planning.

Community partners and workshop participants built or enhanced their knowledge and skills in systems thinking and system dynamics to support the ongoing use and development of the community food system vision, model, and shared insights. Community requests for skill building workshops for group model building to further enhance capacity and support ongoing exploration of community food system priorities and planning reflects the dedicated engagement and commitment of those involved in the study to mobilize action. It also reflects that this

research brought benefits. Through respectful and collaborative relationships, the participatory processes in this food systems approach prioritized Indigenous knowledge and integrated cultural practices and values throughout the research process. The present study integrated community practices for visioning, ceremony, and knowledge sharing, and respected core cultural values such as youth and elder involvement, collective thinking, and considering future generations under the KSDPP Code of Research Ethics (KSDPP, 2023).

This study has limitations. The research findings are specific to the community of Kahnawà:ke; however, this study contributes a model operationalizing the participatory process and methods for their use or adaptation in other settings and contexts. Second, it was not possible to address all identified community food system priorities; further work is required to do so. Recruitment efforts were successful in engaging a diverse group of dedicated people representing many sectors of Kahnawà:ke's food system. This group committed to meeting the demands of the group model building process; however, the representativeness of the sample was limited by a lack of participation from the sector of local food services and markets. Lastly, the community-proposed action ideas were prioritized by participants according to perceived impact and feasibility, providing insight as to how actions could impact the food system and current priorities. However, this study did not explore the relative impact of actions toward desired food system change.

Moving forward, future research and action should focus on further expanding, refining, and validating the system dynamics model developed in this study, for instance, by convening community members involved in local food services and markets. Future work could explore the potential influence of food and beverage marketing (particularly to children and youth) and increasing availability and consumption of ultra-processed foods and sugar-sweetened beverages

(Moubarac et al., 2014). Existing evidence and community-based system dynamics work have highlighted these as potential factors influencing food preferences, food intake (e.g., Gerritsen et al., 2022; McKelvie-Sebileau; Mui et al., 2019), and obesity risk (Smith et al., 2019; Swinburn et al., 2011); however, these were not factors that emerged in this study. The next steps should also focus on evaluating the relative effectiveness of community-led actions in increasing community food production and improving food security outcomes. This research will contribute to informing future food policy work and decisions. Future research could explore food security and food sovereignty governance in Kahnawà:ke to better assist the development, implementation, and evaluation of food policy and action strategies. Building upon the community's understanding of community and political will is relevant to an ongoing need to identify food security leadership (Delormier et al., 2017). The reinforcing feedback loop "valuing community food production" (R9) in the system dynamics model began to describe the value of community food production and its connection with community and political will. However, additional work is needed to understand the conditions influencing values, priorities, and decision-making at individual, community, and political levels.

5. Conclusion

While there is a growing body of literature on community-based approaches to food security and Indigenous food sovereignty, this study contributes a promising innovation by offering a community-based participatory food systems approach to understand the underlying feedback mechanisms and dynamics of community food system priorities. By exploring the interconnectedness of factors, such as land access, workforce development, and sociocultural values, this study offers a distinct understanding of the complexities involved in promoting food security and food sovereignty within one Indigenous community. By modeling the dynamics of

key factors, participants were able to identify leverage points and potential actions for promoting desired food system change. These findings highlight the importance of adopting a systems approach that considers the wholistic and relational nature of Indigenous Peoples' food systems, encompassing social, cultural, economic, and environmental aspects. This collaborative and participatory process enhanced the community's capacity to understand and create change in the system, thus supporting mobilization and collective action promoting food security and Indigenous food sovereignty.

The findings of this study have important implications for both practice and policy. Firstly, the success of this project demonstrates how community-driven research and planning initiatives that honour cultural knowledge, practices, and values must be prioritized in efforts to promote food security and sovereignty for and with Indigenous communities. Participatory food system research and food security initiatives, such as those focusing on improving access to land and resources and facilitating knowledge exchange between generations, are essential. At a governance level, there is a need for greater recognition of Indigenous rights to land and resources, as well as support for policies that prioritize Indigenous-led approaches to food security, food production, and land stewardship. Supporting ongoing collaboration and knowledge sharing between researchers, health practitioners, and Indigenous communities could support the development of contextually relevant solutions that address the root causes of food insecurity and promote Indigenous food sovereignty.

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Conclusion of Thesis

This research aimed to address the expressed need for a comprehensive approach to guide future community food security planning and action in Kahnawà:ke. The purpose of this study was to develop a values-based vision and shared understanding of Kahnawà:ke's food system among Kahnawa'kehró:non. Through co-developing and implementing a community-based participatory food systems approach, this study addressed its three main objectives: envisioning the future of Kahnawà:ke's food system was achieved using participatory visioning, resulting in key vision themes expressing community food system priorities and values; community food production was explored from a systems perspective in group model building workshops to generate a contextual understanding of this key community priority; and the systemic understanding of community food production assisted in identifying community-proposed opportunities for systemic action toward desired food system change.

The significance of this research lies in its contribution to current efforts to close gaps in Indigenous food security, nutrition, and well-being. By reflecting community knowledge and values, the development of a values-based vision and shared understanding of Kahnawà:ke's food system among Kahnawa'kehró:non contributes toward enhancing community capacity, mobilization, collaboration among stakeholders, and successful action planning for community food security and Indigenous food sovereignty. The primary benefit of the study for the Kahnawà:ke community was the initiation of a community-engaged planning process for food security and food sovereignty. As a first step, visioning for the future of the food system has supplied a useful tool to guide community-led decision making by articulating community values and priorities expressed through the food system. Subsequently, group model building was used to operationalize a food systems approach, co-creating a system dynamics model (causal loop

diagram) to visually depict a community group's shared understanding of community food production, and contributing to the empowerment of collective action for community food security and Indigenous food sovereignty. The participatory process used to develop the food system vision and model will facilitate continuing food security and food sovereignty planning and action in Kahnawà:ke by equipping community members with knowledge and skills in systems thinking and group model building approaches valuable to navigating the complexities of food system dynamics and supporting the sustained use and development of the food system vision and model.

This example of a participatory process resulting in a shared vision and understanding of a food system may also guide other community, research, and public health efforts to build food secure and food sovereign food systems using a wholistic approach. Bridging Indigenous and Western (community-based participatory research, community-based system dynamics) research and planning methodologies, this community-based participatory food systems approach represents a new way of thinking and addressing complex food-related issues such as community food security and Indigenous food sovereignty. It offers a wholistic lens to explore the complexity of local food systems and honour the knowledge, culture, and values embedded in them. This study demonstrated how developing contextually relevant actions to advance food security and health equity for Indigenous Peoples requires the engagement and full participation of Indigenous communities in research and planning that responds to their own needs and priorities for community health and well-being. This thesis offers researchers, public health practitioners, and Indigenous communities an approach bringing together Western and Indigenous relational ways of knowing and doing to support community-led food system

planning and change processes which elevate Indigenous Peoples' food and knowledge systems, promote empowerment, and advance equitable food system outcomes for all.

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Appendices

Appendix 1: Participant Consent Forms

McGill
School of Human Nutrition
Faculty of Agricultural and Environmental Sciences
21,111 Lakeshore Road
Ste. Anne de Bellevue, Quebec H9X 3V9

Participant Consent Form - Community Visioning Workshop

Researcher: Shannon Udy, Master's Student, McGill University, School of Human Nutrition, (450) 635-4374, shannon.udy@mail.mcgill.ca. Trainee, Kahnawake schools Diabetes Prevention Program.

Supervisor: Treena Delormier, Associate Professor, School of Human Nutrition, Associate Director, Center for Indigenous Peoples' Nutrition and Environment, McGill University, (514) 398-7705, treena.delormier@mcgill.ca. Scientific Director, Kahnawake schools Diabetes Prevention Program.

Title of Project: Building a Participatory Food Systems Approach to Community Food Security and Indigenous Food Sovereignty in Kahnawà:ke.

Sponsor: This research study is funded by Kahnà:wake Shakotiia'takehnhas Community Services (KSCS) and Canadian Institutes of Health Research (CIHR).

Community approval: note that KSDPP Code of Research Ethics is being respected and the project has been approved by the KSDPP Community Advisory Board (July 7, 2022)

Purpose of the Study: You are being invited to take part in a research study to develop a vision and shared understanding of Kahnawà:ke's food system to promote food security, nutrition, and well-being. This study aims to support community-led action planning for food security and food sovereignty in Kahnawà:ke by using a planning approach that looks at the food system wholistically. The first part of the study focuses on creating a shared vision of the food system that expresses community values and priorities. The vision will inform the second part of the study where a group of community members will collaboratively model Kahnawà:ke's food system and identify opportunities to promote community food security and food sovereignty. You are being invited to take part in the community visioning workshop.

Study Procedures*:* The visioning workshop will bring together 20 to 35 community participants to envision a hoped future for Kahnawà:ke's food system, one that reflects community values and priorities. The workshop will be held at a local setting in Kahnawà:ke and led by the Core Modeling Team (CMT) that includes myself (Shannon Udy), my supervisor (Treena Delormier), and five community collaborators. This workshop will be about 3 hours and include breaks. Food and beverages will be offered.

During the visioning workshop a community facilitator will guide a discussion about past and present states of the community food system and imagining a hoped future food system. You will be asked to write your reflections on paper as a few words, statements, or drawings. You will be invited to share your reflections in a series of small and large group discussions. During large group discussions, a member of the CMT will cluster the papers into vision themes on a wall. You will then be asked to take part in an exercise to discuss and refine the themes and identify shared priorities for Kahnawà:ke's future food system. Large group discussions will be audio-recorded, and notes will be taken. I will later transcribe (type-out) the audio recordings. The audio recording, notes, and photographs will be used for later analysis and description. No participants will be photographed, and photographs will not be included in the reporting of study results.

If you agree to participate in the study, you will be asked to fill out an optional anonymous demographic questionnaire before the visioning workshop. You can choose to fill it out online (LimeSurvey) or using a postage-paid postcard. This questionnaire will take about 5 minutes of your time. You will be asked questions about your gender, age group, and the main activities you do contributing to Kahnwà:ke's food system. Your answers to the questions will be anonymous (not linked to you personally). I will use the information from the questionnaire to ensure that I am including a range of community members with different perspectives of Kahnawà:ke's food

system. Your information you will be combined with other participant's information and may be reported in a summary format in the study results.

Dissemination of Results: The knowledge generated in this workshop as part of the larger study will be shared first within Kahnawà:ke in the form of a presentation to the community at a Kahnawà:ke Schools Diabetes Prevention Program (KSDPP) Community Advisory Board meeting. I will also be sharing a summary report(s) and presentation for participants and the wider Kahnawà:ke community. The knowledge generated will also inform my thesis in fulfillment of a Master of Science (Nutrition) program at McGill University. The study results will later be shared publicly with Indigenous, academic, and scientific audiences in the form of web versions of summary report(s), publications in scientific or peer-reviewed journals, and presentations at scientific conferences or meetings.

Voluntary Participation: Your participation in this study is voluntary. If you decide to be part of the study, it is your choice to take part in the demographic questionnaire and any of the workshop activities or discussions. You may withdraw from the study at any time, for any reason, without negative consequences. If you decide to withdraw from the study, I will remove any information from the data that identifies you directly or indirectly (e.g., name, position, organization, relatives). It will not be possible to remove other information you contributed during the workshop because your contributions will become part of a collective vision making it difficult to remove the contributions of one person. It will not be possible to withdraw your demographic information since it will be anonymous.

Potential Risks: There are no known risks in taking part in this research. The topics discussed and workshop activities are not expected to cause you emotional, psychological, or physical stress. The research focuses on the values, hopes, strengths, and assets of the community relating to the local food system and are likely topics you think about or discuss in your everyday life. If any discussions cause you distress that you would like support with, we will help you get appropriate support or professional help. You do not have to participate in any workshop activities or discussions you are not comfortable with. You may step out of the workshop or withdraw your participation in the study at any time.

To reduce the risk of COVID-19 transmission and illness, we will be following all McGill University and Kahnawà:ke COVID-19 health and safety measures in place at the time of the workshop. Currently there are no mandatory measures in place, but we strongly encourage you to wear a face mask. We will offer masks at the workshop. We will be closely monitoring the situation and any changes in the level of risk and health and safety measures will be communicated to you.

Potential Benefits: Participating in this study will have no direct benefit to you. However, the workshop will provide you an opportunity to voice your perspective for the future of Kahnawà:ke's food system. The main benefit of this study for the community of Kahnawà:ke is to support community planning for food security and food sovereignty. As a first step, visioning for the future of the food system will supply a useful tool to guide community-led decision making by expressing community values and priorities for Kahnawà:ke's food system. The shared vision will guide future community workshops that aim to create a shared understanding of Kahnawà:ke's food system and provide a planning framework for collective action to enhance the community food system. It is hoped that this process may also guide other Indigenous community, research, and public health efforts to build food secure and food sovereign food systems using a wholistic approach.

Compensation: To acknowledge the time you have taken to be involved in this study you will receive a $25 honorarium. You will also be reimbursed for transportation and childcare expenses if you need them. Elders will be offered a small gift. If you decide to withdraw from the study part way through or after the workshop you will still receive the honorarium or reimbursement you were expecting to receive.

Confidentiality: All information you provide during the study is confidential. We will be gathering information in the form of audio recordings and notes of large group discussions, and photographs of vision themes. I will use the audio recording to create a transcript of the group discussion. It is your choice if you want your name and or position shared in the workshop to remain confidential. You may want to be identified by your name and or

position to allow any quotes or stories you share to be attached to your identity. You can indicate if you would like your name and or position to be used in the reporting of results (presentations summaries, thesis, publications) on the last page of this consent form. In the case that you prefer to keep your identity confidential, any personal information (such as your name, position, organisation, specific references to relatives or people) that could be used to identify you (directly or indirectly) will be removed or altered from workshop transcripts and notes and not included in any reports, publications, or presentations of study results. Your data will be assigned a random identification (ID) number and pseudonym (fake name) that will link your consent form to your data. Your consent form will be stored separately from all workshop data so that it will not be possible to link your identity to your data.

Please be aware that there are limits to confidentiality in a workshop setting. All participants in the workshop will be asked to respect the confidentiality of others. However, there is no guarantee that they will do so. Please keep this in mind when choosing what you feel comfortable sharing. It is possible that you may be identifiable to other people in the community by participating in this study and by the information you choose to share. The information that you share in the demographic questionnaire is anonymous and no one will know that you completed it.

I will be the only person with access to materials with your personal information and will store them securely in separate encrypted digital files on a password protected computer or in a locked filing cabinet until the end of the study, after which they will be destroyed. Workshop transcripts and notes (without your personal information), and photographs of the vision themes will be shared with members of the CMT using a password protected McGill Microsoft OneDrive for Business folder to allow their collaboration in the analysis and interpretation of the data. The CMT will be familiar with the data as they will be present during the workshops. All members of the CMT are required to sign a confidentiality agreement. At the end of the study, I will securely transfer workshop transcripts, notes, photographs, and demographic information to the KSDPP general manager using a password protected Microsoft OneDrive for Business folder. These materials will be securely stored by KSDPP and myself for a minimum of 7 years (estimated 2030) before being deleted. During this time, the KSDPP general manager and myself will be the only people with access to the study's data.

Questions*:* If you have any questions about the study, you may contact Shannon Udy or Treena Delormier using the contact information at the top of page 1 of this consent form.
If you have any ethical questions or concerns about your rights that may arise in relation to the research, you may contact the KSDPP Ratirwahseron:nis (Ombudsperson): Diane Labelle, (514)-214-7143, dlabelle@conseilscolaire-schoolcouncil.org.

If you have any ethical concerns or complaints about your participation in this study, and want to speak with someone not on the research team, you may contact the McGill Associate Director of Research Ethics: Lynda McNeil, (514)-398-6831, lynda.mcneil@mcgill.ca. Please include the REB file number: [22-08-076].

Please check the following boxes that apply to you:
Yes: ___ No: ___I agree to be identified by name in a quote used in the reporting of study results, when possible.
Yes: ___ No: ___I agree to be identified by my position in a quote used in the reporting of study results, when possible.
Yes: ___ No: ___I agree to be contacted to receive study results and be invited to community presentations.

Please sign below if you have read the above information and consent to participate in this study. Agreeing to participate in this study does not waive any of your rights or release the researchers from their responsibilities. A copy of this consent form will be given to you and the researcher will keep a copy.

Participant's Name: (please print) _____

Participant's Signature: _____ Date: _____

Participant ID code: _____ Participant pseudonym: _____

Participant e-mail or mailing address for the purpose of receiving study results and invitations to community presentations only:

School of Human Nutrition
Faculty of Agricultural and Environmental Sciences
21,111 Lakeshore Road
Ste. Anne de Bellevue, Quebec H9X 3V9

Participant Consent Form - Community Group Model Building Workshops

Researcher: Shannon Udy, Master's Student, McGill University, School of Human Nutrition, (450) 635-4374, shannon.udy@mail.mcgill.ca. Trainee, Kahnawake schools Diabetes Prevention Program (KSDPP).

Supervisor: Treena Delormier, Associate Professor, School of Human Nutrition, Associate Director, Center for Indigenous Peoples' Nutrition and Environment, McGill University, (514) 398-7705, treena.delormier@mcgill.ca. Scientific Director, Kahnawake schools Diabetes Prevention Program (KSDPP).

Title of Project: Building a Participatory Food Systems Approach to Community Food Security and Indigenous Food Sovereignty in Kahnawà:ke.

Sponsor: This research study is funded by Kahnà:wake Shakotiia'takehnhas Community Services (KSCS) and Canadian Institutes of Health Research (CIHR).

Community approval: note that KSDPP Code of Research Ethics is being respected and the project has been approved by the KSDPP Community Advisory Board (July 7, 2022)

Purpose of the Study: You are being invited to take part in a research study to develop a vision and shared understanding of Kahnawà:ke's food system to promote food security, nutrition, and well-being. This study aims to support community-led action planning for food security and food sovereignty in Kahnawà:ke by using a planning approach that looks at the food system wholistically. The first part of the study focuses on creating a shared vision of the food system expressing community values and priorities. In the second part of the study, a community group of community members will collaboratively model Kahnawà:ke's food system and identify opportunities to promote community food security and food sovereignty. You are being invited to participate in community group model building workshops.

Study Procedures*:* The group model building workshops will bring together 10 to 25 community participants to co-create a systems model that visualises the parts and relationships of Kahnawà:ke's food system and focuses on a community identified priority. Three group model building workshops will be held at a local setting in Kahnawà:ke and led by the Core Modeling Team (CMT) that includes myself (Shannon Udy), my supervisor (Treena Delormier), and three to five community members. The first workshop will be about 6 hours and the second workshop will be about 3 hours, including breaks. Food and beverages will be offered. The two workshop sessions will be separated by about 1-2 weeks.

During group model building workshops, the CMT will be guiding a series of group activities and discussions. In the first workshop you will be asked to participate in hands-on modeling activities that explore trends, factors, relationships, and the structure of Kahnawà:ke's food system. Activities will be completed in small groups of 3-5 participants. You will be invited to share your understanding, knowledge, and experiences by drawing graphs, maps, and diagrams and by participating in small and large group discussions. The second workshop will involve the CMT presenting the food system model (causal loop diagram) that integrates the groups' activities and discussions into a visual representation of the interconnected factors that influence the community-identified priority. The group will be asked to review and revise and the food system model to ensure that the group's collective understanding has been accurately represented. Using the model of the food system, you will be asked to share ideas of potential opportunities to enhance the current food system. Large group discussions will be audio-recorded, and notes will be taken. I will later transcribe (type-out) the audio recordings. Photographs of the workshop outputs (graphs, maps, and diagrams) will be captured after the workshop. The audio recording, notes, and photographs will be used for later analysis and description. No participants will be photographed, and photographs will not be included in the reporting of study results.

If you agree to participate in the study, you will be asked to fill out an optional anonymous demographic questionnaire before the first workshop. You can choose to fill it out online (LimeSurvey) or using a postage-paid postcard. This questionnaire will take about 5 minutes of your time. You will be asked questions about your gender, age group, and the main activities you do contributing to Kahnwà:ke's food system. Your answers to the questions will be anonymous (not linked to you personally). I will use the information from the questionnaire to ensure that I am including a range of community members with different perspectives of Kahnawà:ke's food system. Your information you will be combined with other participant's information and may be reported in a summary format in the study results.

Dissemination of Results: The knowledge generated in this workshop as part of the larger study will be shared first within Kahnawà:ke in the form of a presentation to the community at Kahnawà:ke Schools Diabetes Prevention Program (KSDPP) Community Advisory Board meeting. I will also be sharing a summary report(s) and presentation for participants and the wider Kahnawà:ke community. The knowledge generated will also inform my thesis in fulfillment of a Master of Science (Nutrition) program at McGill University. The study results will later be shared publicly with Indigenous, academic, and scientific audiences in the form of web versions of summary report(s), publications in scientific or peer-reviewed journals, and presentations at scientific conferences or meetings.

Voluntary Participation: Your participation in this study is voluntary. If you decide to be part of the study, it is your choice to take part in the demographic questionnaire and any workshop activities or discussions. You may withdraw from the study at any time, for any reason, without negative consequences. If you decide to withdraw from the study, I will remove any information from the data that identifies you directly or indirectly (e.g., name, position, organization, relatives). It will not be possible to remove other information you contributed during the workshops because your contributions will become part of a collective understanding making it difficult to remove the contributions of one person. It will not be possible to withdraw your demographic information since it will be anonymous.

Potential Risks: There are no known risks in taking part in this research. The topics discussed and workshop activities are not expected to cause you emotional, psychological, or physical stress. The research focuses on the values, hopes, strengths, and assets of the community relating to the local food system and are likely topics you think about or discuss in your everyday life. If any discussions cause you distress that you would like support with, we will help you get appropriate support or professional help. You do not have to participate in any workshop activities or discussions you are not comfortable with. You may step out of the workshop or withdraw your participation in the study at any time.

To reduce the risk of COVID-19 transmission and illness, we will be following all McGill University and Kahnawà:ke COVID-19 health and safety measures in place at the time of the workshops. Currently there are no mandatory measures in place, but we strongly encourage you to wear a face mask. We will offer masks at the workshops. We will be closely monitoring the situation and any changes in the level of risk and health and safety measures will be communicated to you.

Potential Benefits: Participating in this study will have no direct benefit to you. However, the workshops will provide you an opportunity to voice your knowledge, understanding, and perspectives on Kahnawà:ke's food system. The main benefit of this study for the community of Kahnawà:ke is to support community planning for food security and food sovereignty. Guided by the shared vision and priorities for Kahnawake's food system developed earlier in the study, community group model building workshops aim to create a shared understanding of Kahnawà:ke's food system and provide a planning framework for collective action to enhance the community food system. It is hoped that this process may also guide other Indigenous community, research, and public health efforts to build food secure and food sovereign food systems using a wholistic approach.

Compensation: To acknowledge the time you have taken to be involved in this study you will receive a $25 honorarium for each of the three workshops that you participate in. You will also be reimbursed for transportation and childcare expenses if you need them. Elders will be offered a small gift. If you decide to withdraw from the study part way through or after one of the three workshops, you will receive the honorarium or reimbursement you

were expecting to receive for each workshop you began.

Confidentiality: All information you provide during the study is confidential. We will be gathering information in the form of audio recordings and notes of large group discussions, and photographs of workshop outputs (graphs, maps, and diagrams). I will use the audio recording to create a transcript of the group discussions. It is your choice if you want your name and or position shared in the workshop to remain confidential. You may want to be identified by your name and or position to allow any quotes or stories you share to be attached to your identity. You can indicate if you would like your name and or position to be used in the reporting of results (presentations summaries, thesis, publications) on the last page of this consent form. In the case that you prefer to keep your identity confidential, any personal information (such as your name, position, organisation, specific references to relatives or people) that could be used to identify you (directly or indirectly) will be removed or altered from workshop transcripts and notes and not included in any reports, publications, or presentations of study results. Your data will be assigned a random identification (ID) number and pseudonym (fake name) that will link your consent form to your data. Your consent form will be stored separately from all workshop data so that it will not be possible to link your identity to your data.

Please be aware that there are limits to confidentiality in a workshop setting. All participants in the workshops will be asked to respect the confidentiality of others. However, there is no guarantee that they will do so. Please keep this in mind when choosing what you feel comfortable sharing. It is possible that you may be identifiable to other people in the community by participating in this study and by the information you choose to share. The information that you share in the demographic questionnaire is anonymous and no one will know that you completed it.

I will be the only person with access to materials with your personal information and will store them securely in separate encrypted digital files on a password protected computer or in a locked filing cabinet until the end of the study, after which they will be destroyed. Workshop transcripts and notes (without your personal information), and photographs of the workshop outputs will be shared with members of the CMT using a password protected McGill Microsoft OneDrive for Business folder to allow their collaboration in the analysis and interpretation of the data. The CMT will be familiar with the data as they will be present during the workshops. All members of the CMT are required to sign a confidentiality agreement. At the end of the study, I will securely transfer workshop transcripts, notes, photographs, and demographic information to the KSDPP general manager using a password protected Microsoft OneDrive for Business folder. These materials will be securely stored by KSDPP and myself for a minimum of 7 years (estimated 2030) before being deleted. During this time, the KSDPP general manager and myself will be the only people with access to the study's data.

Questions*:* If you have any questions about the study, you may contact Shannon Udy or Treena Delormier using the contact information at the top of page 1 of this consent form.

If you have any ethical questions or concerns about your rights that may arise in relation to the research, you may contact the KSDPP Ratirwahseron:nis (Ombudsperson): Diane Labelle, (514)-214-7143, dlabelle@conseilscolaire-schoolcouncil.org.

If you have any ethical concerns or complaints about your participation in this study, and want to speak with someone not on the research team, you may contact the McGill Associate Director of Research Ethics: Lynda McNeil, (514)-398-6831, lynda.mcneil@mcgill.ca. Please include the REB file number: [22-08-076].

Please check the following boxes that apply to you:
Yes: ___ No: ___I agree to be identified by name in a quote used in reporting of study results, when possible.
Yes: ___ No: ___I agree to be identified by my position in a quote used in the reporting of study results, when possible.
Yes: ___ No: ___I agree to be contacted to receive study results and be invited to community presentations.

Please sign below if you have read the above information and consent to participate in this study. Agreeing to participate in this study does not waive any of your rights or release the researchers from their responsibilities. A copy of this consent form will be given to you and the researcher will keep a copy.

Participant's Name: (please print) _____

Participant's Signature: _____ Date: _____

Participant ID code: _____ Participant pseudonym: _____

Participant e-mail or mailing address for the purpose of receiving study results and invitations to community presentations only:

Email or mailing address:_____

Appendix 2: Participant Demographic Questionnaire

Demographic Questionnaire for Community Workshop Participants

Researcher: Shannon Udy, Master's Student, McGill University, School of Human Nutrition, (450) 635-4374, shannon.udy@mail.mcgill.ca. Trainee, Kahnawake schools Diabetes Prevention Program.

Supervisor: Treena Delormier, Associate Professor, School of Human Nutrition, Associate Director, Center for Indigenous Peoples' Nutrition and Environment, McGill University, (514) 398-7705, treena.delormier@mcgill.ca. Scientific Director, Kahnawake schools Diabetes Prevention Program.

Title of Project: Building a Participatory Food Systems Approach to Community Food Security and Indigenous Food Sovereignty in Kahnawà:ke.

You are invited to participate in a demographic questionnaire for the research study entitled *"Building a Food Systems Approach to Community Food Security and Indigenous Food Sovereignty in Kahnawà:ke."*

The purpose of this questionnaire is to help the researcher ensure a range of community members with different perspectives of Kahnawà:ke's food system are included in the research.

This questionnaire will take about 5 minutes of your time. Your answers to the questions will be anonymous (not linked to you personally).

Your participation in this questionnaire is voluntary. You may skip any questions you do not want to answer, and you may stop the questionnaire at any time without consequence. Once you mail the questionnaire, it will not be possible to withdraw your information because it will not be linked to you.

The information you provide in this questionnaire will be combined with other participant's information and may be reported in summary form in community and academic reports, publications, and presentations that will not identify you personally.

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1. What are the main activities you do that contribute to Kahnawà:ke's food system?
   - Please describe _____
   - Prefer not to answer

2. What is your gender?
   - Male
   - Female
   - Other _____
   - Prefer not to answer

3. What is your age?
   - 16-30
   - 31-45
   - 46-60
   - 61-75
   - 76 or older
   - Prefer not to answer

Niá:wen / Thank you!

Version 1 Nov 5, 2022

Appendix 3: Core Modeling Team Confidentiality Agreement

McGill School of Human Nutrition
Faculty of Agricultural and Environmental Sciences
21,111 Lakeshore Road
Ste. Anne de Bellevue, Quebec H9X 3V9

Confidentiality Agreement for Members of the Core Modeling Team

Researcher: Shannon Udy, Master's Student, McGill University, School of Human Nutrition, (450) 635-4374, shannon.udy@mail.mcgill.ca. Trainee, Kahnawake schools Diabetes Prevention Program.

Supervisor: Treena Delormier, Associate Professor, School of Human Nutrition, Associate Director, Center for Indigenous Peoples' Nutrition and Environment, McGill University, (514) 398-7705, treena.delormier@mcgill.ca. Scientific Director, Kahnawake schools Diabetes Prevention Program.

Title of Project: Building a Participatory Food Systems Approach to Community Food Security and Indigenous Food Sovereignty in Kahnawà:ke.

The Core Modeling Team is a group of individuals involved in community group workshop design, planning, recruitment, facilitation, and analysis of research data. I understand that as a member of the Core Modeling Team, I am privy to confidential information.

I agree to keep all research information and associated records gathered during this study confidential by not discussing or sharing them in any form or format with anyone outside the Core Modeling Team.

I also agree that:

- I will keep all research information secure while it is in my possession. I will comply with the instructions of the researcher about requirements to physically and/or digitally secure records.
- I will not reproduce or distribute research information in any manner, in full or in part, without the specific instruction of the researcher.
- I will not allow anyone outside the Core Modeling Team access to the research information.
- I will not disclose any directly or indirectly identifying information about research participants to anyone outside the Core Modeling Team.
- I will return all research information to the researcher when I have completed any research related tasks.
- After completing any research related tasks, I will destroy all research information that is not returnable to the researcher, after consulting the researcher for specific instructions.

Core Modeling Team Member

_____	_____	_____
(Print Name)	(Signature)	(Date)

Researcher

_____	_____	_____
(Print Name)	(Signature)	(Date)

Version 1 Nov 5, 2022

Appendix 4: Community Group Workshops Facilitation Manual

Building a Participatory Food Systems Approach to Community Food Security and Indigenous Food Sovereignty in Kahnawà:ke

Community Group Workshops Facilitation Manual

Community Visioning and Group Model Building

By Shannon Udy, MSc Nutrition Student, School of Human Nutrition, McGill University

Last updated: July 21, 2023

Acknowledgments

The following facilitation manual was drafted by Shannon Udy for the study entitled *Building a participatory food systems approach to community food security and Indigenous food sovereignty in Kahnawà:ke.*

The materials in this facilitation manual are adapted from the group model building resources of Scriptapedia, Gerritsen et al. (2020), and resources of Kelsey Werner and Ellis Ballard for the Group Model Building track of the Systems Science for Social Impact (SSSI) 2022 Summer institute in St. Louis, MO hosted 25-29 July 2022.

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Community Group Workshop Objectives

Explicit Objectives

- Develop a values-based vision of Kahnawà:ke's food system among Kahnawakehró:non.
- Develop a shared understanding of Kahnawà:ke's food system around a community-identified priority issue.
- Identify potential opportunities to create systemic change for Kahnawà:ke's food system.

Implicit Objectives

- Articulate community values and priorities expressed through the food system.
- Promote collaboration and collective action for community food security and food sovereignty.
- Grow community capacity in systems thinking and system dynamics to address complex priority issues.

Planning Logistics

Materials

- Consent forms
- Pens
- Name tags
- Thick tipped markers
- Letter paper in two different colours
- Flip chart paper
- Painter's tape
- Dot stickers
- Camera to capture workshop outputs
- Audio-recorder to record large group discussions
- Laptop computer/tablet for notetaking
- Table, cups, plates, cutlery, napkins, refreshments, food, and waste bins for meal

Room

- Multiple whiteboards or large work surfaces on which we can tape papers
- Tables and chairs organised as small groups of 3-5 people each
- Digital projector and screen

Session 1: Developing a Vision for the Food System

Summary Agenda

Opening, meal, group introductions – 35 min
Food system brainstorming – 20 min
Creating a shared vision – 80 min
Priority setting – 30 min
Next steps and closing – 15 min

Anticipated Outputs

Creating a shared vision – shared vision for the future food system (thematic vision clusters)
Priority setting – list of shared priorities and consensus on a priority issue

Detailed Agenda

Time	***Activity and Lead(s)***	***Facilitation Details***
45-60 min	**Room set-up** Core modeling team Community facilitator: KM	Set up space, tables and chairs, workshop materials (sheet paper, markers, identify wall space for theme clustering, rip tape), write agenda whiteboard/flip chart. Set up/test audio equipment (microphone/speaker, audio recorders). Set up consent table (consent forms, pens). Set up serving table for meal (cups, plates, cutlery, napkins, refreshments, food) and waste bins. Review core modeling team/facilitation roles.
35 min	**Consent, opening, meal, group introductions** Consent: SU, VW, AM Opening: Otsi'tsaken:ra Community facilitator: KM	Core modeling team and facilitator welcomes and thanks participants for joining the workshop as they come in. Ensure each participant has completed consent. Direct to consent table as needed. Begin Opening/Ohén:ton Karihwatéhkwen/The words that come before all else, once everyone has arrived. Community facilitator overviews the purpose of the workshop and summary agenda. *E.g., In this workshop we will explore a vision for our community food system. A vision describes our hopes for our future food system and reflects our values. Today we will create a shared vision and then use it to identify shared priorities.* Overview workshop agenda. Ask the group if anyone has any questions and remind participants that they are free to ask questions at any time. Remind participants that they are free to step out or withhold from group discussions or activities as desired and may withdraw from the study at any point today or in the future. Everyone shares a meal together. Community facilitator leads group through short icebreaker exercise to introduce one another (name, what brings you to the workshop). <u>Break (5 min)</u> Set a time for everyone to come back.
20 min	**Food system brainstorming** Community facilitator: KM Co-facilitator: SU Wall builders: DM, TM Process coaches: AS, TD, AM, VW Recorders: RR	<u>Introduction (5 min)</u> Community facilitator welcomes everyone back and explains how before we can envision a hoped future for the community food system, we need to briefly brainstorm as a group about what the food system is and what it means for our community. Co-facilitator writes prompts on the white board/flip chart to guide the discussion and community facilitator reads aloud: - *What is a food system?* - *What is Kahnawà:ke's food system?* - *Where does our food come from?* <u>Group discussion (10 min)</u> Community facilitator invites participants to share their ideas and thoughts with the full group one at a time. Remind participants that there are no right or wrong answers. We want to hear all perspectives and experiences. Reflect what you heard and ask clarifying questions as needed. As participants share, wall builders may sketch a rough mind-map to capture participants reflections around the word "food" that we can refer to throughout the workshop. <u>Ways of thinking about food system (5 min)</u> Co-facilitator explains some of the different ways that people understand food systems. The following are some examples used to help understand food systems: - *Food security working group mind-map (Derek Montour)*

		- *Food systems wheel for Indigenous Peoples' food systems (FAO, 2021)* - *Good food planning tool (Brimblecombe, 2014)* Provide a brief overview of 2-3 examples using slide set or printed copies. Highlight any new ideas that these examples bring that have not yet been mentioned in the discussion. Process coaches walk around the room and support participants as needed and provide team with feedback. VW will ensure the audio-recorder is ON for full group discussion. Recorder will take notes of all full group discussions and decisions made.
80 min	**Creating a shared vision** Community facilitator: KM Co-facilitator: SU Wall builder: DM, TM Process coaches: AS, TD, AM, VW Recorder: RR	Introduction to activity (5 min) Community facilitator introduces the visioning activities to create our food system vision. Refer to the Kahnawà:ke Shared Vision Statement, highlighting how it did not address a vision for the community food system. Community facilitator explains how we use sheets of paper to individually write our reflections to each visioning prompt as words, statements, or a drawing. There will be two prompts and for each prompt we will use a different coloured sheet of paper to capture our reflections. We will capture as many of our reflections as we want, using one sheet of paper per reflection. Community facilitator provides examples:  Co-facilitator writes the first prompt on the whiteboard and community facilitator reads it aloud: *"What about of our community's food system do you treasure and want to preserve for the next generation?"* Writing visions (5 min) Participants individually write/draw reflections to the first prompt on sheet paper.

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		Small group discussion (10 min) Community facilitator invites participants to discuss their reflections in their small groups. When one minute is left the facilitator asks participants to start thinking about the reflections they want to share with the full group first. Full group share out (15 min) Ask for a small group to volunteer to share first. Then go around the room by asking the next small group to share, requesting ideas that have not yet been shared by others. Reflect what you heard and ask clarifying questions as needed. After everyone has shared once, co-facilitator checks time and do another round of the full group or ask if anyone has an important reflection they want to share. Co-facilitator writes the second prompt on the whiteboard and community facilitator reads it aloud: *"What do you hope our community's food system will become for the next generation?" "Imagine our community food system in 25 years. Imagine you are a child walking through the community. What do you see?"* Writing visions (5 min) Participants individually write/draw reflections to the second prompt on a different coloured sheet paper. Small group discussion (10 min) Community facilitator invites participants to discuss their reflections in their small groups. When one minute is left the facilitator asks participants to start thinking about the reflections they want to share with the full group first. Full group share out (15 min) Ask for a small group to volunteer to share first. Then go around the room by asking the next small group to share, requesting ideas that have not yet been shared by others. Reflect what you heard and ask clarifying questions as needed. After everyone has shared once, co-facilitator checks time and do another round of the full group or ask if anyone has an important reflection they want to share. While participants share with the full group, the community facilitator gives the sheets of paper to the wall builder. The wall

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		builder listens and clusters the sheets of paper into themes on a wall. Break (10 min) Set a time for everyone to come back. Themes (10 min) The wall builder will share and explain the vision themes that emerged and ask the group, *"does this resonate with you? Are there other themes you notice, or any changes you would make?"* Rearrange the clusters and themes as needed. With group agree on names to describe each theme and post above each thematic cluster. Process coaches walk around the room and support participants as needed and provide team with feedback. VW will ensure the audio-recorder is ON for full group discussions and OFF when participants are working in their small groups. Recorder will take notes of all full group discussions and decisions made.
30 min	**Priority setting** Community facilitator: KM Co-facilitator: SU Wall builders: DM, TM Process coaches: AS, TD, AM, VW Recorder: RR	Identifying priorities (5 min) Community facilitator explains how we can think of each theme from the previous activity as focus areas for action planning for Kahnawà:ke's food system. In other words, each theme can be stated as a priority area. For example, we can restate the theme [insert one of the group themes, e.g., 'community food production' as 'promote community food production.'] Community facilitator will work with the full group to restate the remaining themes as priority areas and ask the group, *"does this resonate with you? Are there any changes you would make? Is anything missing?"* Wall builders write each priority area on separate pieces of flip chart paper and tapes them next to each other on wall. Ranking priorities using dot vote (10 min) Pass out 8 dot stickers per participant.

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		Community facilitator will ask participants to place 4 of their dots on the priorities that are most important to them. They can distribute the dots in any way they want (e.g., put all of them next to one priority, across several). Wall builders tally the dots under each priority to create a ranked list by importance. Community facilitator will then ask participants to place 4 of their dots on the priorities that they consider most feasible. They can distribute the dots in any way they want (e.g., put all of them next to one priority, across several). Wall builders tally the dots under each priority to sort the ranked list of importance by feasibility. Community facilitator will emphasise that the priorities of each list with the most dots isn't "the winner," but helps the us focus on important themes as we move into the next discussion. Remind participants that the list of ranked priorities will be brought forward into future group model building workshops to create a shared understanding of the system surrounding a priority issue and generate ideas for action. Full group discussion (10 min) Community facilitator will open the room for discussion about the ranked lists of priorities asking *"does this resonate with you? Are there any changes you would make?"* Wall builder will rearrange the order as needed with consensus of the group. Co-facilitator: If there is disagreement among the group about competing priorities, consider and discuss with group whether the competing priorities are mutually exclusive and can be meaningfully incorporated into one priority. Discuss with group which would benefit most from a systemic understanding to help create an action plan. **Priority must change over time to be modeled**

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		will ensure the audio-recorder is ON for the full group discussion. Recorder will take notes of full group discussions and decisions made.
15 min	**Next steps and closing** Community facilitator: KM Co-facilitator: SU Closing: Otsi'tsaken:ra	Community facilitator thanks everyone for their contributions and co-facilitator identifies what will be happening next: - Qualitative analysis of visioning workshop (SU) - Creating a summary report of food system vision to share back to the group and wider community (SU) - Group model building workshops to create a food system model that centres a community priority - If participants are interested in learning about the group model building workshops, please let Shannon know Community facilitator asks if there are any questions, final reflections, or comments. Facilitator thanks participants for coming. Begin closing.
30 min	**Debrief** Core modeling team Community facilitator: KM	After participants have left, co-facilitator will take a photo of all workshop artifacts: thematic vision clusters, priorities with dot vote, and final list of ranked priorities. Check-in with team. *E.g., How is everyone feeling about how the workshop went? What went well? What didn't go well? What did everyone learn? How could the workshop have been improved?*

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Session 2: Priority Issue Identification, Factor Elicitation, and Structure Elicitation

Summary Agenda

1:00 PM: Consent (10 min)
1:10 PM: Opening, and group introductions (35 min)
1:45 PM: Presenting the food system vision and key priority (30 min)
2:15 PM: Graphs over time (50 min)
3:05 PM: Break (10 min)
3:15 PM: Connection circles (40 min)
3:55 PM: Causal loops diagrams in small groups (65 min)
5:00 PM Meal Break (30 min)
5:30 PM Causal loops diagrams share out (20 min)
5:55 PM Presenting the initial consolidated causal loop diagram (30 min)
6:20 PM Next steps and closing (15 min)

Anticipated Outputs

Presenting the key priority – consensus on the priority issue to be mapped (reference mode)
Graphs over time – candidate factors for cognitive mapping
Connection circles - 1 connection circle per group
Causal loop diagram – 1 causal loop diagram per group
Initial consolidated causal loop diagram

Detailed Agenda

Time	*Activity and Lead(s)*	*Facilitation Details*
12:00 - 1:00 PM	**Room set-up** Core modeling team	Set up space, tables and chairs, workshop materials (sheet paper, markers, identify wall space for graphs and chart paper, rip tape), write agenda on whiteboard/flip chart. Set up projector/screen. Set up/test audio equipment (audio recorders). Set up consent table (consent forms, pens). Set up serving table for meal (cups, plates, cutlery, napkins, refreshments, food) and waste bins.
1:00 - 1:45 PM	**Consent, opening, group introductions**	Core modeling team welcomes and thanks participants for joining the workshop as they come in.

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	Consent: Vivienne, Alexis Opener: Treena Facilitator: Shannon	Opener: Begin Opening/Ohén:ton Karihwatéhkwen/The words that come before all else, once everyone has arrived (1:10 PM). Facilitator: Overviews the purpose of the group model building workshop and summary agenda of the session. *E.g., Group model building is a process for bringing people together to develop a model of a system, create a shared understanding and insights, and to build consensus for enacting change. Over the next two workshops we will go through a sequence of activities designed to create a food system model that centres a key community priority. Today we will focus on the first few activities in that process.* Overview workshop agenda. Ask the group if anyone has any questions and remind participants that they are free to ask questions at any time. Remind participants that they are free to step out or withhold from group discussions or activities as desired and may withdraw from the study at any point today or in the future. Facilitator leads group through short icebreaker exercise to introduce one another (name, organization/local food). Facilitator shares a metaphor to introduce concept of system dynamics in complex systems. *[E.g., Elephant parable: "Six blindfolded people approach an elephant in the wild. Without knowing what this creature is, they each touch a different part of the elephant. When asked, the one holding onto the trunk confidently says that an elephant is a snake! The one holding on onto the tail defiantly says, no, an elephant is a type of rope! Each of these blindfolded folks are right from where they sit, but none have a complete understanding of the whole elephant. It's only when the people share their experiences of the parts with one another that they can come to understand the elephant as a whole" (Chin et al., 2021)]* Facilitator relates the parable back to the purpose of group model building by emphasising that we all see components of a system and often the complete system is complex. Through the activities we have gathered to do we hope to gain a more wholistic view of our food system as it relates to a priority issue.

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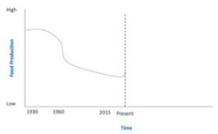
1:45 - 2:15 PM	**Presenting the food system vision and key priority** Facilitator: Shannon Modeler-facilitator: Kelsey Recorder(s): Vivienne, Alexis	<u>Presenting the food system vision and key priority (30 min)</u> The facilitator recaps and shares the food system vision themes and ranked list of priorities identified by the group in workshop session 1, using a 5 min presentation on screen. The facilitator introduces the candidate priority issue (community food production) by explaining it as a reference mode. A reference mode is an issue that is dynamic (changes over time) such that when we act within a system, we can change the dynamic from an undesired pattern to the desired pattern. Modeler draws the candidate reference mode on whiteboard/chart paper and explains how the trend was sketched from existing data (if available) and/or <u>elaborated based on our assumptions</u>. Draw up to present time. Community food production (trend over time)  The facilitator asks the group: *"does this capture your perspective? Is there anything you would change?"* Modeler will redraw the reference mode if needed. With full group, elicit multiple time horizons (hoped and alternate scenarios/status-quo). *What is the change you want to see (hope)? What would this look like if nothing changes (status-quo)?*

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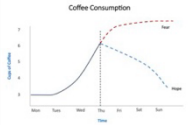
		Group check-in: *"Is this what we should be focusing on, or something else?"* Recorder(s) will take notes of group discussions (interconnections) and ensure audio-recorder is ON for the group discussion.
2:15 - 3:05 PM	**Graphs over time** Facilitator: Shannon Modeler-facilitator: Kelsey Wall builder: Treena Recorder(s): Vivienne, Alexis	<u>Introduction to graphs over time (5 minutes)</u> Facilitator explains how graphs over time is designed to help brainstorm factors that affect or are affected by the priority issue, and how those factors have changed over time. Modeler-facilitator introduces the coffee reference mode as an unrelated example. *What factors influence or are influenced by coffee consumption?* Coffee example reference mode (credit Kelsey Werner)  Using the coffee example, begin drawing an example graph. - Label the X axis as time with a beginning and an end time. Explain that any timeline can be chosen to suit the story you want to tell about your factor, or idea (e.g., seasons, months, years, etc.). Add vertical dashed line to represent the present. - Label the Y axis with the factor. Explain that any scale for the factor can be chosen (e.g., low-high, numbered, etc.). Then draw a line to represent expected change over time.

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		Facilitator introduces the example factor (credit Kelsey Werner)  The facilitator explains that we want to begin thinking about factors that affect community food production and sketch how they have changed over time. <u>Draw graphs individually (10 min)</u> Divide participants into small groups. Hand out sheets of paper with X and Y axis drawn on them. Facilitator asks participants to draw one graph per factor in response to the statement: *"What affects or is affected by community food production?"* Write statement on the whiteboard/flip chart. Facilitator: *"Draw graphs individually first and then we'll share in small groups. You can create as many graphs as you can think of. We'll be walking around if you have any questions."* The facilitator, modeler, and wall-builder walk around and answer any questions about the activity. <u>Small group discussion (10 min)</u> Facilitator invites participants to discuss their graphs in their small groups and choose the graphs they think are most important. When one minute is left the facilitator asks participants to stack their graphs with the most important ones on top.

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		<u>Full group share out (20 min)</u> Ask for a small group to volunteer to share first. Encourage the group to explain the factor in the graph, their understanding of how it has changed, and any thoughts they have about why it is changing in this way. Then go around the room by asking the next small group to share. Reflect what you heard and ask clarifying questions as needed. After everyone has shared once, check time and do another round of the full group or ask if anyone has an important graph they want to share. <u>Themes (5 min)</u> While participants share with the full group, the facilitator gives the sheets of paper to the wall builder. The wall builder listens and clusters the sheets of paper into themes on a wall. The wall builder will share and explain the themes that emerged. Reflect on interconnections between graphs, or similarities/differences between what small groups shared. Summarize the dynamics emerging from the participants' graphs that help characterize the priority issue. Wall builder: *"Would anyone suggest any changes or describe any different themes?"* Rearrange the graphs as needed. Recorder will take notes of all full group discussions (interconnections) and decisions made. Recorder will ensure the audio-recorder is ON for full group discussions and OFF when participants are working in their small groups.
3:05 - 3:15 PM		<u>Break (10 min)</u> Set a time for everyone to come back.

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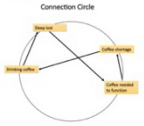
3:15 - 3:55 PM	**Connection circle** Facilitator: Vivienne Modeler-facilitator: Kelsey Recorder(s): Shannon, Alexis	<u>Introduction to connection circle (10 minutes)</u> Facilitator introduces activity. Explain we want to draw connections between factors (from our graphs and new ones) that are important in the system affecting community food production. We are going to draw connection circles. Connection circles are a visual tool that can help us identify and understand important factors and the connections between them. Facilitator introduces the activity by going back to the coffee example, explaining: - Factor-naming (neutral, change over time) - Connections (arrows) - Connection to reference mode Connection circle example (example adapted from Kelsey Werner)  <u>Connection circles in small groups (10 min)</u> Divide participants into small groups. Pass out chart paper. One team member will sit with each group to provide clarification and positive feedback for the first 2 min. After about 5 min facilitator/modeler circulate around the room visiting groups: - First round feedback focus on helping groups helping groups clarify their representations - Second round focus on identifying a group that has a good example to start the next activity Facilitator gives a heads up when 1 minute is left until we share our connection circles with the full group.

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		Small group share out (20 min) Ask for a group to volunteer to share first. Have each group share their connection circle, highlighting any connections the group found most important or relevant, or any lingering questions. Invite questions from the full group. Highlight similarities and differences across the connection circles. Recorder(s) will take notes of all full group discussions (interconnections). Recorder will ensure the audio-recorder is ON for full group discussions and OFF when participants are working in their small groups.
3:55 - 5:00 PM	**Causal loop diagrams** Facilitator: Shannon Modeler-facilitator: Kelsey Recorder(s): Kaylia, Treena	Introduction to causal loop diagrams (20 minutes) Facilitator introduces activity. Explain we want to keep building upon the relationships between factors (previous factors new ones) captured in connection circles. Causal loop diagrams are a visual tool to help us understand how factors in the system are interconnected in such a way to generate the trends in community food production we see over time. E.g., *We have created connection circles that begin to capture our understanding of the connections between factors influencing community food production. These circles show relationships in the system. Now we will build off our connection circles to create causal loop diagrams. Causal loop diagrams help us examine the system surrounding community food production more holistically by looking at the relationships and the interconnections between parts of the system as a whole. Causal loop diagrams tell us a story of how community food production continues over time and later will gives us insight into how actions or interventions could affect the entire system.* Modeler-facilitator introduces the diagramming process by going back to the coffee example, explaining: - Factor-naming (neutral, change over time) - Arrows and direction (polarity) - Reinforcing and balancing feedback loops - Connection to reference mode

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		Coffee causal loop diagram example (credit Kelsey Werner)  Causal loop diagrams in small groups (45 min) Divide participants into small groups. Pass out chart paper. One team member will sit with each group to provide clarification and positive feedback for the first 5 min. After about 10 min facilitator/modeler circulate around the room visiting groups: - First round feedback focus on helping groups clarify their representations - Second round focus on helping them explain their causal loop diagram Facilitator gives a heads up when 5 minutes are left until we break for a meal, after which we will share our diagrams with the full group.
5:00 - 5:30 PM		Meal Break (30 min) Small group causal loop diagrams integrated into one causal loop diagram by the core modeling team to be presented back to participants.

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5:30 - 5:50 PM	**Causal loop diagrams (cont.)** Facilitator: Shannon Modeler-facilitator: Kelsey Recorder(s): Kaylia, Treena	Small group share out (20 min) Ask for a group to volunteer to share first. Have each group explain their causal loop diagrams, highlighting any interconnections and feedback loops the group found most interesting, or any lingering questions. Invite questions from the full group. Highlight similarities and differences across the causal loop diagrams. Summarise overlapping loops and emerging ideas. Recorder(s) will take notes of all full group discussions. (interconnections). Recorder will ensure the audio-recorder is ON for full group discussions and OFF when participants are working in their small groups.
5:50 - 6:20 PM	**Presenting the initial consolidated causal loop diagram** Facilitator: Kaylia Modeler-facilitator: Kelsey Recorder(s): Kaylia, Treena	Presenting initial consolidated causal loop diagram (30 min) The facilitator and modeler share the initial consolidated causal loop diagram integrated from small group causal loop diagrams during break. The integrated map is drawn on chart paper/white board. Modeler walks through the integrated map describing: - Relationships and their underlying narrative - Relation to priority issue (reference mode) - Emerging insights and lingering questions The facilitator asks the group: *"does this capture your perspective? Is there anything you would change?"* The modeler makes changes in the causal loop diagram in a different colour and asks clarifying or probing questions as needed. Recorder(s) will take notes of group discussion and decisions made and ensure audio-recorder is ON for the group discussion.
6:20 PM	**Next steps and closing** Facilitator: Shannon	Facilitator thanks everyone for their contributions and identifies what will be happening next: - Initial consolidated causal loop diagram will be reviewed and refined between workshops by the core modeling team - Next workshop session, gather to review the consolidated causal loop diagram and identify opportunities for action to promote food system priorities.

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		Facilitator asks if there are any questions, final reflections, or comments. Facilitator thanks participants for coming.
	Debrief Core modeling team	After participants have left, recorder will take a photo of all workshop artifacts: small group causal loop diagrams, initial consolidated causal loop diagram. Check-in with team. *E.g., How is everyone feeling about how the workshop went? What went well? What didn't go well? What did everyone learn? How could the workshop have been improved?*

Causal Loop Diagrams:

Positive polarity (+)

Factors move in the same direction

👍👍 increase leads to an increase

👎👎 decrease leads to a decrease

Negative Polarity (-)

Factors move in the opposite direction

👍👎 increase leads to a decrease

👎👍 decrease leads to an increase

Reinforcing feedback loop (R)

Compounds the initial direction of change (amplifying change over time)

Balancing feedback loop (B)

Counters the initial direction of change (limiting change over time)

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Session 3: Identifying Action Ideas

Summary Agenda

1:00 PM Consent
1:10 Opening, meal, introductions, recap last session(35 min)
1:45 Model review (50 min)
2:35 Break (10 min)
2:45 Action ideas (65 min)
3:50 Next Steps and Closing (10 min)

Anticipated Outputs

Model review – validated causal loop diagram and themes, shared understanding of the system
Action ideas – list of prioritised opportunities for action

Detailed Agenda

Time	***Activity and Lead(s)***	***Facilitation Details***
12:00 PM	**Room set-up** Core modeling team	Set up space, tables and chairs, workshop materials (sheet paper, markers, identify wall space priority matrix, rip tape), write agenda and prompts (action ideas) on whiteboard/flip chart. Redraw consolidated model on chart paper or smart/white board. Set up/test audio equipment (audio recorders), consent materials (consent forms, pens). Set up serving table for meal (plates, cutlery, napkins, cups, refreshments, food) and waste bins.
1:10-1:45 PM	**Opening, meal, group introductions, recap last session** Facilitator: Shannon Opening: Treena	Core modeling team welcomes and thanks participants for joining the workshop as they come in. Begin Opening/Ohén:ton Karihwatéhkwen/The words that come before all else, once everyone has arrived. Facilitator overviews the purpose of the group model building workshop and summary agenda of the session. *E.g., Last workshop session we created causal loop diagrams to capture our understanding of the relationships and interconnections between factors influencing community food production. Causal loop diagrams tell us a story of how community food*

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		production continues over time and gives us insight into how actions or interventions could affect the entire system. Today we will be exploring opportunities for action to create desired change. Overview workshop agenda. Ask the group if anyone has any questions and remind participants that they are free to ask questions at any time. Remind participants that they are free to step out or withhold from group discussions or activities as desired and may withdraw from the study at any point today or in the future. Everyone shares a meal together. Facilitator leads group through short exercise to re-introduce one another as needed (name, an insight/reflection from last workshop). Briefly recap last session by reviewing key priority issue of community food production and causal loop diagrams in small groups.
1:45-2:35 PM	**Model review** Facilitator: Vivienne Modeler: Shannon Recorder: Alexis, Kaylia	Presenting the consolidated causal loop diagram (15 min) The facilitator/modeler share the consolidated causal loop diagram that was created and refined from small group causal loop diagrams by the core modeling team. The consolidated model is redrawn on chart paper or smart/white board. Facilitator/modeler walk through the consolidated diagram describing: - Feedback loops and their underlying narrative - Any new variables or connections added - Themes that emerged - Emerging insights and lingering questions (running list) Divide participants into small groups. Small group discussion (10 min) Groups discuss the consolidated model and identify any areas they agree or disagree with and make note of suggestions to refine the model. Full group refinements (20 min) Elicit refinements from each small group, one at a time. Discuss any proposed changes with the full group. The modeler makes changes in a different color marker and asks clarifying or probing questions as needed.

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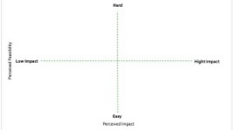
		Hear at least one suggestion from each group and then open to the full group for additional refinements. Closing reflections (5 min) The modeler summarizes refinements made to the model, pointing out reinforcing and balancing loops, and highlights any emerging insights. Recorder(s) will take notes of all full group discussions and decisions made. Recorder(s) will ensure the audio-recorder is ON for full group discussions and OFF when participants are working in their small groups. Break (10 min) Set a time for everyone to come back.
2:45-3:50 PM	**Action ideas** Facilitator: Kaylia Wall builder: Shannon Recorder: Vivienne, Alexis	Introduction to action ideas (10 minutes) Facilitator introduces activity and priority matrix drawn on white board/chart paper (feasibility on Y-axis and impact on X-axis). Explain we want to identify as many actions as we can that could impact the system surrounding community food production. After we brainstorm ideas, we will share with the full group and prioritise the actions according to how easy or hard they would be to implement (feasibility), and if implemented, the potential impact they could have on community food production. 

		Facilitator writes prompt on the whiteboard and reads it aloud: Could you impact.... - **factors** (increase or decrease) *e.g., an intervention that would create opportunities to volunteer such as "high-school volunteer program."* - **connections** (strengthen, create, weaken, delete, speed up, or slow down) *e.g., an intervention to help increase traditional/local food consumption by impacting health awareness such as "nutrition curriculum in schools" Doing this would change the system by strengthening the connection between health awareness to traditional/local food consumption.* - **rules** (incentives, punishments, constraints) that govern the system (such as laws, policies, mandates, agreements, etc.) *e.g., a policy to guarantee scholarship/bursaries for students while they pursue education and training programs "education and training funding policy."* - **goals** that the system/pieces of the system try to achieve (purposes) *e.g., a goal to add to the community land base "addition to reserve."* - **mindsets** (the perspective(s) that are held that shape the way the system or pieces of the system are structured, that could include the whole system) *e.g., a change in mindset for the way people think individualistically to collectivist. This is creating the conditions for several feedback loops and transforming that mindset would likely result in a different system.* *[Viv: language and culture as a container for mindset; mindset rooted in Kanien'kéha]* Encourage participants to look at the causal loop diagram and identify places where they might intervene. Emphasise that the actions should all be focused on community food production. Brainstorming ideas (10 min) Participants individually write their ideas on sheet paper using one sheet per idea.

		Small group discussion (10 min) Facilitator invites participants to discuss their ideas in their small groups. When one minute is left the facilitator asks participants to sort their actions from the most important to the least important. Full group share out (20 min) Ask for a small group to volunteer to share first. Then go around the room by asking the next small group to share. Reflect what you heard and ask clarifying questions to make sure everyone understands the action and where it would impact the system by referring to the model. Then ask them to identify where the action should be placed on the wall in terms of feasibility and impact. - *"How easy or hard would this be to implement?"* - *"If successfully implemented, what do you see as the potential impact of this action on community food production?"* As each group shares an action, the wall builder places the action in the quadrant identified by the group. *[Option – add action ideas to causal loop diagram].* After everyone has shared once, check time and do another round of the full group or ask if anyone has an important idea they want to share. Closing reflections and Responsibilities (15 min) The facilitator summarizes reflections back to the group. Highlight actions that are easy to implement and high impact (representing 'low hanging fruit'). Highlight those actions that are hard and high impact (representing areas where knowledge holders, leaders, funders, policy makers, and researchers might be able to help in understanding or modifying the barriers to implementing those ideas). For each action, invite participants to brainstorm as a full group - *"Who is currently working on this?"* - *"What actions might I be able to contribute to?"* Modeler writes names of organizations/groups/people on sticky-notes and posts next to each action.

		Recorder(s) will take notes of full group discussion and record actions and where they act in the model. Recorder will ensure the audio-recorder is ON for full group discussions and OFF when participants are working in their small groups.
3:50 PM	**Next steps and closing** Facilitator: Shannon Closing: Treena	Facilitator thanks everyone for their contributions and identifies what will be happening next: - Model refinements and data analysis (Shannon and core modeling team) - Creating a summary report/presentation of food system model to share back to the group and the community (Shannon) Facilitator/closer opens discussion for continuing work: - Community ownership of food system vision and model - How will the model be used? e.g., designing, implementing, and evaluating actions, advocacy, funding, future research, etc., and continually built upon as new knowledge is gained and actions create change in the system over time - Community priorities not yet addressed - Skill-sharing workshop on group model building process Facilitator asks if there are any questions, final reflections, or feedback. Facilitator thanks participants for coming. Begin closing.
4:00-4:15 PM	**Debrief** Core modeling team	After participants have left, recorder will take a photo of all workshop artifacts: action ideas on priority matrix, refined causal loop diagram (if redrawn). Check-in with team. *E.g., How is everyone feeling about how the workshop went? What went well? What didn't go well? What did everyone learn? How could the workshop have been improved?*

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Appendix 5: Food System Priority Ranking Survey

Food System Priorities Survey for Community Workshop Participants

Researcher: Shannon Udy, Master's Student, McGill University, School of Human Nutrition, (450) 635-4374, shannon.udy@mail.mcgill.ca. Trainee, Kahnawake schools Diabetes Prevention Program.

Supervisor: Treena Delormier, Associate Professor, School of Human Nutrition, Associate Director, Center for Indigenous Peoples' Nutrition and Environment, McGill University, (514) 398-7705, treena.delormier@mcgill.ca. Scientific Director, Kahnawake schools Diabetes Prevention Program.

Title of Project: Building a Participatory Food Systems Approach to Community Food Security and Indigenous Food Sovereignty in Kahnawà:ke.

You are invited to participate in a food system priority ranking survey for the research study entitled "Building a Food Systems Approach to Community Food Security and Indigenous Food Sovereignty in Kahnawà:ke."

The purpose of this survey is to rank community food system priorities according to urgency and feasibility. The ranked priorities will help focus future workshops that aim to create a shared understanding of the system structuring a key priority issue and generate ideas for community action.

This survey will take no more than 30 minutes of your time. Your answers to the questions will be anonymous (not linked to you personally). We do not collect or use internet protocol (IP) addresses or other information which could link your participation to your computer or electronic device.

Your participation in this questionnaire is voluntary. You may skip any questions you do not want to answer, and you may stop the survey at any time without consequence. Once you submit the survey, it will not be possible to withdraw your information because it will not be linked to you.

The information you provide in this survey will be combined with other participant's information and will be reported in summary format in community and academic reports, publications, and presentations that will not identify you personally.

1. Please rank the following community food system priorities based on their level of urgency (level of immediate attention and action needed), with 1 indicating low urgency and 5 indicating high urgency.

	1	2	3	4	5
Enhance community food security: promote equitable access to sufficient, nutritious, and culturally appropriate food within the community.	○	○	○	○	○
Enhance food sovereignty: restore and strengthen a culturally significant food system that supports self-sufficiency and is sustainable for future generations.	○	○	○	○	○
Promote community health: promote community health by embracing active lifestyles and nutritious diets supported by the production and consumption of local and traditional foods.	○	○	○	○	○
Support community food production: support diverse processes of producing local and traditional foods (e.g., gardening, planting, growing using greenhouses/hydroponics, animal farming, harvesting, hunting, fishing).	○	○	○	○	○
Increase access to food system resources: increase the accessibility of resources needed to support community food system activities (e.g., seeds, soil, wildlife and plants, time, funding, labour, community gardens, community kitchen, collective canning equipment, chicken processing plant, greenhouses, hydroponics, agricultural hub).	○	○	○	○	○
Increase access to land: increase access to land to support community food system activities (e.g., agriculture, harvesting, hunting, fishing, community food infrastructure such as a community kitchen, food processing plant, and agricultural hub).	○	○	○	○	○
Promote knowledge sharing: promote sharing of culturally significant food-related knowledge, practices, and values to ensure continuity of the food system.	○	○	○	○	○
Promote education and training: promote education and training opportunities to empower community members to engage with the food system.	○	○	○	○	○

2. Please rank the following community food system priorities based on their level of feasibility (how easy or hard they would be to address), with 1 indicating low feasibility and 5 indicating high feasibility.

	1	2	3	4	5
Enhance community food security: promote equitable access to sufficient, nutritious, and culturally appropriate food within the community.	○	○	○	○	○
Enhance food sovereignty: restore and strengthen a culturally significant food system that supports self-sufficiency and is sustainable for future generations.	○	○	○	○	○
Promote community health: promote community health by embracing active lifestyles and nutritious diets supported by the production and consumption of local and traditional foods.	○	○	○	○	○
Support community food production: support diverse processes of producing local and traditional foods (e.g., gardening, planting, growing using greenhouses/hydroponics, animal farming, harvesting, hunting, fishing).	○	○	○	○	○
Increase access to food system resources: increase the accessibility of resources needed to support community food system activities (e.g., seeds, soil, wildlife and plants, time, funding, labour, community gardens, community kitchen, collective canning equipment, chicken processing plant, greenhouses, hydroponics, agricultural hub).	○	○	○	○	○
Increase access to land: increase access to land to support community food system activities (e.g., agriculture, harvesting, hunting, fishing, community food infrastructure such as a community kitchen, food processing plant, and agricultural hub).	○	○	○	○	○
Promote knowledge sharing: promote sharing of culturally significant food-related knowledge, practices, and values to ensure continuity of the food system.	○	○	○	○	○
Promote education and training: promote education and training opportunities to empower community members to engage with the food system.	○	○	○	○	○

Appendix 6: Community Food System Visioning Report

Building a Participatory Food Systems Approach to Community Food Security and Indigenous Food Sovereignty in Kahnawà:ke

Envisioning the Future of Kahnawà:ke's Food System

Date of workshop: May 17, 2023

Location: Kahnawà:ke Office Complex

Summary report prepared by Shannon Udy, MSc Nutrition Student, School of Human Nutrition, McGill University

Last updated: June 22, 2023

Introduction

Context and Purpose of the Workshop

This workshop represents the first part of a research study to develop a vision and shared understanding of Kahnawà:ke's food system to promote community food security, nutrition, and well-being. This study aims to support community-led action planning for food security and food sovereignty in Kahnawà:ke by using a planning approach that looks at the food system wholistically. The first part of the study focuses on creating a shared vision of the food system that expresses community values and priorities. The vision will inform the second part of the study where a group of community members will collaboratively model Kahnawà:ke's food system and identify opportunities to promote community food security and food sovereignty. This report summarized the results of the food system visioning workshop – *Envisioning the future of Kahanwà:ke's food system.*

Workshop Overview

This visioning workshop brought together sixteen community participants to envision a hoped future for Kahnawà:ke's food system. The workshop was held at the Kahnawà:ke Office Complex on May 17, 2023. The workshop was co-developed and led by a project team that included Shannon Udy (student researcher), Treena Delormier (research supervisor), Derek Montour, Alexis Shackleton, Vivienne Walz, Kaylia Marquis, Takariwaienhne McComber, Ravyn Regis, and Karennahawi McComber (facilitator).

Following opening words by Otsi'tsaken:ra (Charlie) Patton, the group shared a meal together and each person introduced themselves. During the visioning workshop Karennahawi guided a discussion about past and present states of the community food system and imagining a hoped future food system. Participants wrote their reflections to visioning prompts on paper as a few words, statements, or drawings. They were also invited to share their reflections in a series of small and large group discussions.

Large group discussions were audio-recorded by Alexis and Vivienne, and notes were taken Ravyn and Treena. Following the workshop, Shannon transcribed (typed-out) the audio recordings. She then used the audio recording, notes, and workshop artifacts (participants reflection papers) to generate vision themes using qualitative content analysis. The resulting themes describe the groups shared vision for Kahnawà:ke's food system and were used to name community food system priorities. The themes and priorities were reviewed by members of the project team and their feedback was incorporated into this report.

Community Group Workshop Objectives:

- Develop a values-based vision of Kahnawà:ke's food system among Kahnawakehró:non.

Characteristics of Workshop Participants

Workshop participants provided anonymous responses to an optional demographic questionnaire before the workshop. Sixteen people answered questions about their age and gender; fourteen also answered a question describing their main involvement in Kahnawà:ke's food system. Please see Table 1 for demographic characteristics of workshop participants.

Table 1. Demographic Characteristics of Workshop Participants

Characteristics	Number	%
Age (years)		
16-30	3	19
31-45	2	13
46-60	4	25
61-75	4	25
76 or older	1	6
Gender		
Female	10	62
Male	6	38
Other	0	0
Primary involvement in Kahnawà:ke's food system		
Food security/sovereignty initiatives	3	21
Food production/generation	5	35
Food processing/preparation	2	14
Food distribution/assistance	2	14
Purchasing/consuming local foods	3	21
Research	1	7
Environment	1	7

Key Themes and Findings

Seven major themes emerged from the analysis: (1) community food system activities and resources, (2) knowledge sharing, education, and training, (3) social relationships, (4) community involvement and participation, (5) natural environment and ecosystems, (6) food security and health, and (7) culture and heritage.

Theme 1. Community Food System Activities and Resources

Participants expressed a strong desire to enhance food system activities within the community including diverse processes of food production, storage, distribution, processing, and preparation. They also highlighted the importance of increasing community access to key resources that support such activities. This theme emerged as a way to strengthen food sovereignty and reduce reliance on external food and resources.

Food Production. Participants described the production of local and traditional foods through "family/home gardens", planting (in particular, tionhnhehkwen, the three sisters – flint corn, beans, squash), "greenhouses and hydroponics for year-round growing," "animal farms (chicken, pigs, cows)," "bison herds," "harvesting," "hunting," and "fishing."

Food Storage and Distribution. Participants described food storage and distribution processes within the community, including food assistance "programs like the Kateri Food Basket" that help to provide food to those in need, the importance of "sharing what is grown/caught/hunted" and the storing and sharing "seeds that have their integrity."

Food Processing and Preparation. Participants reflected on food processing and preparation activities that emphasize collective and cooperative processes and infrastructure, including a "community kitchen" for high quantity food preparation/processing and other cooperative, non-profit food processing models such as "collective canning" and "chicken processing."

Access to Food System Resources. Participants described key resources needed to support food system activities within the community. Participants emphasised land, seeds, soil, medicinal plants, food bearing trees, wildlife, time, funding, labour, incentives for people to enter agriculture and food-related jobs, and community food infrastructure including community gardens, a community kitchen, collective canning equipment, a chicken processing plant, greenhouses, hydroponics, and an agricultural hub that serves as a central facility and network supporting community food system activities. "The knowledge that exists in the community about food production, sharing, preserving, storing, distribution" was also acknowledged as a vital resource that requires access to knowledge holders, keepers, and elders.

Theme 2. Knowledge Sharing, Education, and Training

Participants emphasized the importance of food-related knowledge sharing, education, and training. This theme emerged as a way to ensure the sustainability and continuity of the local food system for future generations.

Knowledge Sharing. Participants stressed the importance of transmitting and sharing culturally significant knowledge, practices, and values, particularly from elders to youth regarding the food system: "the day we stop passing it on to youth or the day that they stop embracing it will be the day that it ends." Participants envisioned a future in which "all generations [know] how to produce foods for themselves."

Education and Training. Participants emphasized education and training that encompasses both formal and informal learning opportunities ranging from primary and secondary education to higher education programs and activities, vocational training, as well as informal community education programs and activities. Examples included primary and secondary school involvement in food planting, the community garden, and food and cultural learning opportunities for youth, adults, elders, and knowledge holders. Other examples included

secondary and post-secondary programs for traditional agriculture, and a Guardians program to support youth with on-the-land education. Such initiatives were seen as contributing to the preservation of community food heritage and self-sufficiency.

Theme 3. Social Relationships

Social relationships emerged as one of the main themes highlighting how social relationships and food are intricately linked. Participants expressed how “food brings us together” and “producing food ensures we have to work as one.” Food was seen as essential for building and enhancing positive social connections. Participants also expressed a strong desire to support communal sharing of food and resources, and collective processes for producing, processing, and distributing food. Sharing was seen as a crucial practice for food security and leveraging collective strengths. Participants also recognized the value of learning from and supporting each other and other communities. Reflecting traditional roles and responsibilities, several participants emphasized a desire for women to be valued in “sustaining tionhnhehwen.”

Theme 4. Community Involvement and Participation

Participants expressed a strong desire for increased community involvement and participation in the community food system. Participants emphasized the importance of a strong commitment to action and change, youth engagement, and community participation and collaboration in the food system and decision-making. This theme emerged as a way to support community self-determination, empowerment, and the ability to shape the food system according to community needs and values.

Commitment to Action and Change. Participants emphasised the importance of a strong commitment to action and change. Change was primarily seen as arising from increasing community involvement in cultural food production activities. “Do it! Just do it.” Change was also seen as arising from a shift in thinking and a collective change in attitudes toward food and the food system. As one participant reflected, “seeds to be planted in the minds of people. Where we have to start. Feeds social, cultural identity.”

Youth Engagement. Participants expressed the importance of engaging youth and providing them with positive community role models actively contributing to the local food system—from the Mohawk Council to community organizations, neighbors, and family. Modeling to youth was seen as a means to pass on knowledge, skills, values, norms, and behaviours that empower youth to engage in the community food system. “The kids are looking at their mothers and fathers and they're going to be what they see. They are looking at their grandparents, they’re going to be what they see, they model what they see…. We need to convince our people now to rethink how we model and become examples for kids, from the point of view of our culture, from the ways that are our ancestors left us.”

Community Participation and Collaboration. Participants recognized the importance of community participation and collaboration in the food system and expressed a strong desire for increased community involvement in discussions and decision-making shaping the local food system. This was seen as a way to bring everyone's mind together and move forward as one to support food system change. Participants also recognized the importance of "respect for diverse ways of protecting and promoting [the] food system" and valuing the wide range of roles and responsibilities that are needed to support this: "the farmers, the cooks, the dishwashers, they're really important to us." Participation in the food system was seen as an opportunity for community members to build a "sense of pride and accomplishment in their work and contribution to the community," as well as an "opportunity for [generating] own source revenues."

Theme 5. Natural Environment and Ecosystems

Participants expressed a strong connection to the natural environment and ecosystems in which community food system activities and resources are embedded. This theme emerged to recognize natural elements as a source of nourishment, cultural heritage, and spiritual connection. Participants expressed a strong commitment and responsibility to care for the land and ecosystems, support biodiversity, and create more natural community spaces that provide food and medicines: "fruit trees," "corn fields," "birds," "bees," "medicine garden." They emphasized the importance of sustainable land use and regenerative practices that account for challenges arising from climate change: "soil regeneration through traditional agriculture" and "sustainable and eco-friendly ways of disposing of waste." "Solution[s] that work to combat climate change" and which are attuned to the seasonality, moons, environment, and ecosystems were viewed as crucial for building a healthier and more resilient food system.

Theme 6. Food Security and Health

Participants expressed the importance of promoting community food security and health. Participants emphasized the need for equitable access to nutritious and culturally appropriate food within the community. Participants envisioned a future in which "every person has access to good food," and where "healthier/happier, active people [are] walking/running/biking and working in their gardens on their land." Participants highlighted the need to go beyond food security to food sovereignty to create a future in which "traditional, culturally significant, genetically diverse, high nutritious foods produced/harvest on a secure land base in sufficient quantities to feed all and generate community revenues." Producing and consuming traditional and locally sourced foods was viewed as a way to promote health and nutrition, i.e., "prevention over treatment."

Theme 7. Culture and Heritage

Culture and heritage emerged as one of the main themes describing the significance of traditional food practices, knowledge, language, ceremony, and cultural identity as it

intertwines and supports all areas of the community food system. Participants expressed the importance of preserving and celebrating cultural heritage and values: “planting using moon, seed songs, not taking more than you need and sharing.” Reclaiming and restoring cultural practices such as “growing our traditional foods” was seen as a way to support the relationship and spiritual connection with people and Mother Earth. “The best time I experience is being in that garden, being with the corn, wind going through. You know it’s a spiritual thing and their talking to you. You can listen.”

Summary of Community Food System Priorities

Priorities linked to the key components of the community food system:

- Enhance community food security: promote equitable access to sufficient, nutritious, and culturally appropriate food within the community.
- Enhance food sovereignty: restore and strengthen a culturally significant food system that supports self-sufficiency and is sustainable for future generations.
- Promote community health: promote community health by embracing active lifestyles and nutritious diets supported by the production and consumption of local and traditional foods.
- Support community food production: support diverse processes of producing local and traditional foods (e.g., gardening, planting, growing using greenhouses/hydroponics, animal farming, harvesting, hunting, fishing).
- Increase access to food system resources: increase the accessibility of resources needed to support community food system activities (e.g., seeds, soil, wildlife and plants, time, funding, labour, community gardens, community kitchen, collective canning equipment, chicken processing plant, greenhouses, hydroponics, agricultural hub).
- Increase access to land: increase access to land to support community food system activities (e.g., agriculture, harvesting, hunting, fishing, community food infrastructure such as a community kitchen, food processing plant, agricultural hub).
- Promote knowledge sharing: promote sharing of culturally significant food-related knowledge, practices, and values to ensure continuity of the food system.
- Promote education and training: promote education and training opportunities to empower community members to engage with the food system.

Priorities linked to the sociocultural context and natural environment:

- Cultivate social relationships: foster social relationships that bring people together and enable collaboration and the sharing of food, resources, infrastructure, knowledge, and responsibilities.
- Encourage community involvement and participation: strengthen collective commitment to action and change, engaging youth, and involving community in food system activities and decision-making.

- Care for the natural environment and ecosystems: caring for the natural environment and ecosystems that are essential for the health and resilience of the food system.
- Protect and promote our culture and heritage: celebrate and honour traditional knowledge, food practices, language, ceremony, cultural identity, and relationships.

Next Steps

Workshop participants are invited to participate in an online survey to rank the priorities linked to the key components of the community food system. These ranked priorities will help focus future community workshops that aim to create a shared understanding of the system structuring a key priority issue and generate ideas for community action.

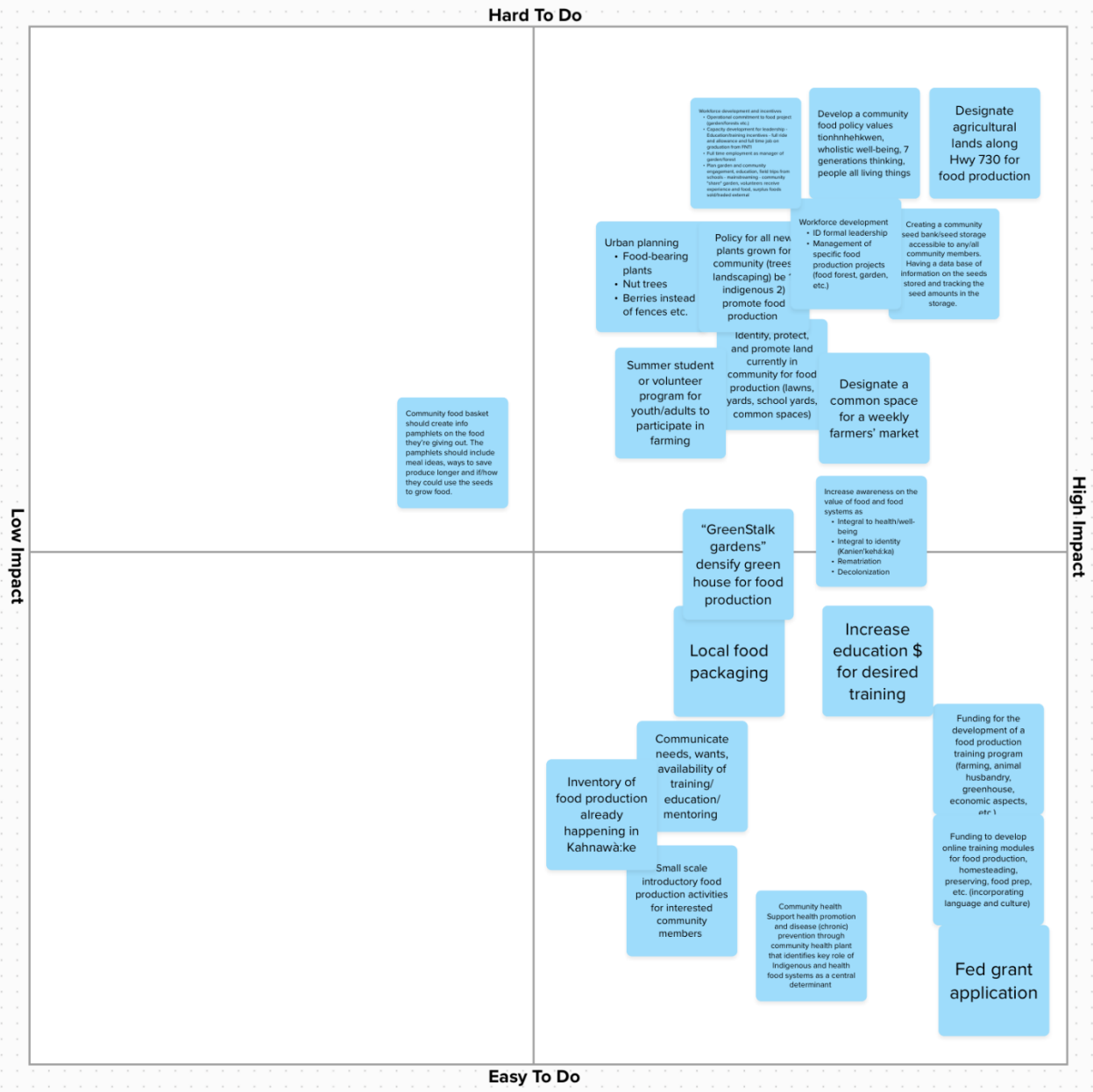
Following the completion of the online ranking survey, a final summary report incorporating the results of the ranking survey will be compiled and shared to participants and the community.

Participant feedback and comments are welcome and can be sent to Shannon Udy shannon.udy@mail.mcgill.ca.

Acknowledgements

Niá:wen / thank you to all workshop participants and team members for their time and valuable contributions. Much gratitude to the Kahnawake Schools Diabetes Prevention Program and Kahnawake Shakotiia'takehnhas Community Services for their generous support and participation in this research project. Special thanks to Treena Delormier for her ongoing mentorship and Diane Labelle, Ratiriwahseron:nis (ombudsperson) for this project.

Appendix 7: Figure S1. Action Ideas Priority Matrix



Action ideas are prioritized according to feasibility (y-axis) and impact (x-axis). Figure generated using Mural.