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Towards Regional Food Security and Food System Sustainability: Findings From a Stakeholder Cognitive Mapping Study

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ABSTRACT

Issue Addressed: Food system sustainability is a broad goal, contributing to resilience, positive health, equity, cultural, environmental and economic outcomes. This study aims to understand the essential components on the journey towards “sustainable food systems” in New Zealand’s, Hawke’s Bay (HB) region.

Methods: Seventeen qualitative semi-structured interviews were conducted to identify barriers, facilitators and potential interventions for improving a sustainable food system. Cognitive mapping (CM) was utilised, generating causal links between themes to answer the question: “What would it take to enhance the HB region to sustain a resilient food ecosystem to supply local people with local food?”.

Results: Three key themes were revealed: community engagement, the establishment of a local distribution system and fostering trust between growers and consumers. Community engagement was the most critical factor, highlighting the need for partnerships with local Iwi (tribe) and hapū (subtribe), support for local and community-based business models, economic sustainability and whakapapa of kai (genealogy of food) education. Establishing a local distribution system was identified as crucial to enhance the efficiency of food distribution and ensure repurposing of surplus food. Fostering trust between growers and consumers is needed to achieve this goal.

Conclusions: These findings underscore the role of community-centric solutions in cultivating a sustainable food system. Rooted in the specific needs and aspirations of the community, the results offer valuable insights into the development of a sustainable food system in HB.

So, What: Through leveraging cognitive mapping, this study provides a novel framework for enhancing community engagement and establishing a local distribution system.

1 | Introduction

Our food systems, as currently designed, are generating negative outcomes, especially for food security, health and the

environment. Data on food security highlights the disparities within New Zealand, showing that 30% of children in the most disadvantaged areas live in households where food insecurity is a regular issue, compared to just 4.6% in wealthier areas and

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that Māori (26.4%) and Pacific (37.3%) communities experience higher levels of food insecurity than their European counterparts (10.9%) [1]. These figures underscore the inequities in access to adequate nutrition and the associated increases in the cost of living have further exacerbated the problem [2]. On the health front, alarming statistics indicate that one in three New Zealand adults over the age of 15 is classified as obese, and one in 10 children faces similar health challenges [3]. These trends point to the growing public health crisis fuelled by our current food system, which is not only affecting individual well-being but also contributing to rising rates of preventable diseases. Moreover, the current food system lacks resilience, particularly in the face of major stressors, such as extreme weather events driven by climate change, global pandemics and economic recessions [4]. Inequities are designed into the system, allowing systemic biases to shape outcomes across society, especially disadvantaging those with lower financial means and leading to widespread food insecurity [5]. The consensus that our current capitalist food system is failing people has led to an increasing global movement towards more sustainable food systems [6].

These systemic failures have contributed to food insecurity becoming a significant issue in New Zealand. Twenty-one percent of households with children in New Zealand struggle to provide an adequate supply of food [7]. Māori disproportionately experience food insecurity and are overrepresented in areas of high deprivation. As of 2023, Māori comprised 28.6% of the population in the Hawke's Bay region, exceeding the NZ national average of 17.8%, [8]. In addition, Hawke's Bay food insufficiency is much higher than the national average [9]. Local research found that 16.8% of students in Hawke's Bay reported facing food insufficiency within their households and only 12.9% of individuals met the national guidelines for vegetable consumption whilst 39.6% met the guidelines for fruit consumption [9]. Hawke's Bay households frequently experience food insecurity and lack access to local food [10]. This is despite Hawke's Bay being the 9th largest contributor to New Zealand's economic landscape, contributing \$6.6 billion in GDP, comprising 3% of the nation's total GDP. Notably, the Port of Napier located in Hawke's Bay played a vital role in facilitating \$5.0 billion worth of New Zealand's goods trade in 2019 alone [11]. Meat and fruit are the region's primary exports [12], showcasing its ability to produce a wealth of local and nutritious produce. However, this highlights a focus on serving international markets rather than meeting the needs of local consumption.

Food insecurity is a predictor of poor physical and mental health [13], and the food system needs to be more sustainable, equitable and resilient to better support health and well-being [6]. The overarching objective of this study is to explore the dynamics of the local food system and its actors in order to understand what is required to move more towards a local, sustainable food system that can contribute to reducing food insecurity. In this context, a "sustainable food system" is defined as an overarching concept that incorporates the principles of the quadruple bottom line [14]: community health, environmental sustainability, local economic development and [Māori] culture. Achieving food security and resilient food systems is a part of this development.

This study was part of the Nourishing Hawke's Bay (NHB) initiative in the Hawke's Bay region. NHB embarked on a project

in 2020 aimed at enhancing community wellbeing through improving the access of children to healthy food. The initial focus of NHB was on food security, with a particular emphasis on schools in areas of high Māori population. Taking a broader food systems approach, the focus has turned to engaging food growers, manufacturers, retailers and communities in the exploration of the potential benefits of a local and sustainable food system for environmental sustainability and community prosperity. The key question is, "What would it take to enhance community involvement within the Hawke's Bay region to sustain a resilient food ecosystem supplying local people with local food?"

This study uses cognitive mapping [15] to describe and communicate the insights of community stakeholders about the barriers and aspirations for more sustainable food systems in Hawke's Bay and enable a rich understanding of the shape of a "regional food system map and collective action plan". The development of a regional food system map and collection plan aims to identify the agricultural stakeholders in the region and determine which of them are willing to collaborate with the community. The goal is to co-create an action plan outlining key interventions that will collectively contribute to building a sustainable food system. Cognitive mapping enables the breakdown of complex research questions, the establishment of priorities for follow-up studies, and the clarification of abstract concepts [16]. This approach offers an open-ended opportunity for stakeholders within the Hawke's Bay region to engage and contribute meaningfully. This is grounded in the principles of co-design, emphasising the importance of shaping solutions based on genuine community needs rather than preconceived assumptions. We have mapped the region's aspirations, and challenges, and identified "key interventions" (desired changes over time) as focal points for interventions. By understanding barriers to and facilitators of increased access, the project has worked with the community to identify interventions that increase the community's access to healthy and affordable food, reducing the dependence of many families on food banks and other social supports [17]. Thus, this paper aims to demonstrate the benefits of employing cognitive mapping as a tool to create visual representations that accurately capture the region's unique challenges and aspirations. The use of cognitive mapping allows for the development of a nuanced depiction grounded in the genuine needs and perspectives of the local community, rather than being shaped by external assumptions or generalised frameworks. By illustrating the lived experiences and insights of the community, this approach ensures that the visual models reflect a more authentic and context-specific understanding of the barriers and opportunities present within the region. Throughout this article, Māori terms and concepts are integral to the discussion. To ensure clarity and accessibility, these terms are explained in detail in the Glossary.

2 | Materials and Methods

2.1 | Participants

Qualitative, semi-structured interviews, using cognitive mapping [18], were conducted with local stakeholders involved in the community's food system, utilising purposive sampling to ensure a diverse range of stakeholders. Using this technique, participants were purposively selected based on specific characteristics

to ensure a comprehensive representation of the community's food system. These characteristics included locational diversity within the Hawke's Bay region, the variety of products produced or handled, the range of organisational sizes, the spectrum of business models employed and the distinctiveness of organisational cultures. Between August and December 2023, 17 regional stakeholders from various organisations were interviewed. These organisations included charities, growers, community gardens, not-for-profit or food rescue groups, educators, agricultural associations, harvesters, distributors, retailers and councils.

A total of 17 interviews were conducted; 14 were conducted face-to-face, and three were conducted online. The average length of the interviews was 52 min. The interviews ranged in duration, with the shortest interview being 27 min and the longest interview lasting 2 h and 31 min. Stakeholders were contacted directly via phone and email, receiving information sheets alongside invitations. All stakeholders provided signed consent. The interviews were conducted by three of the authors and were audio-recorded for analysis, which included extracting notes, direct quotes and themes. Ethics approval for the study was obtained from the Eastern Institute of Technology (REF: EA09210623).

2.2 | Data Collection

The interview questions were developed collaboratively by Authors A.K.S., R.G. (senior research fellow), and D.R. (system mapping and cognitive strategies specialist). These questions were designed using cognitive frameworks that focus on generating causal connections. As a result, they were intentionally semi-structured to allow interviewees the flexibility to share their insights and perspectives on food systems.

The interviews used cognitive mapping to elicit ideas on key concepts, to identify the causal relationship between them, and to better understand what is involved in the potential development of a local, sustainable food system. Analysis involved extracting barriers and solutions articulated by the stakeholders during the cognitive mapping interviews. Cognitive mapping is a visual method to encapsulate a stakeholder's viewpoint regarding a problem or issue, as well as their organisation's connection to that issue [19]. Developing the cognitive mapping map facilitates stakeholders' reflection and sense-making throughout the process, generating interconnected concepts and arrows representing causal relationships [18]. There is a three-layer structure integrated into the tool of cognitive mapping that helps organise data (see Figure 1).

The extract, shown above, illustrates the focus on identifying key drivers, actions and outcomes. By breaking down complex ideas into these categories, it becomes easier to understand how different elements interact and influence each other. A cognitive map was developed from each individual interview and then combined to form a composite map. The composite map offers a visual representation of thematic data arising from the 17 interviews, enhancing understanding of the underlying issue. The remainder of this section describes the key issues that emerged in the interviews and the process of developing the composite map. The final section then describes the findings in detail.

2.3 | Analysis

The analysis of the interviews was led by A.K.S., and secondary analysis was conducted by D.R. These interviews employed a six-step method (Figure 2). The process began [step

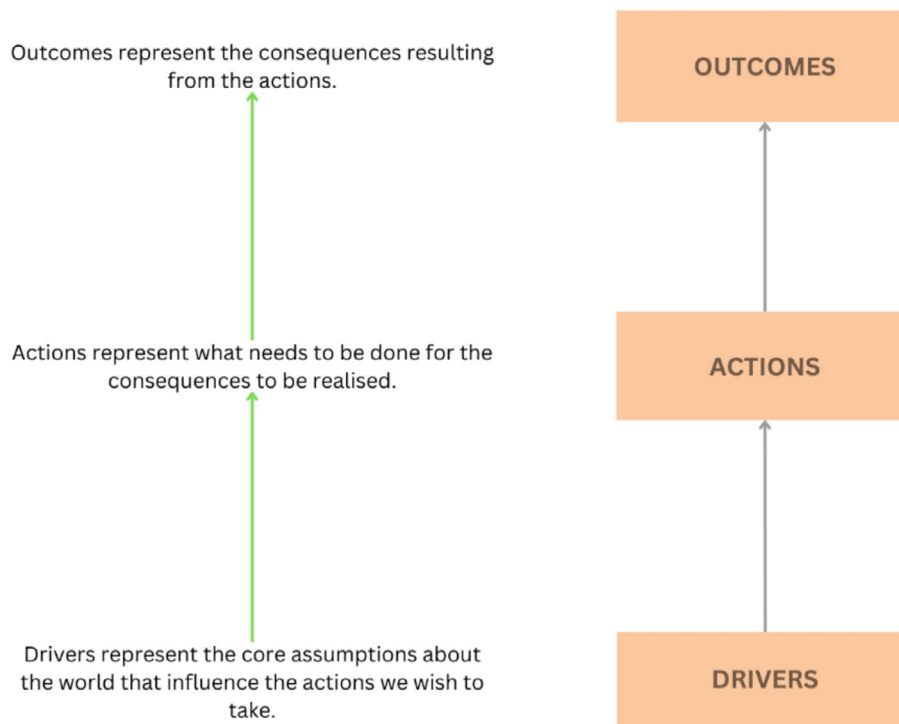


FIGURE 1 | Key drivers, actions and outcomes.

1] with a review of interview notes, extracting themes and quotes and organising them into two main categories for each interview: themes of aspirations and barrier identification. Thus, main themes were identified and explored for causal connections, visually represented by connecting arrows that indicated positive or negative relationships. In step 2, the extracted notes were transcribed onto physical sticky notes and arranged on a large table to construct a cognitive map. Revisiting notes and listening to recordings deepened the authors understanding of relationships between themes. In Step 3, these were transferred to the online platform, Kumu [20]. In step 4, the maps were reviewed by other members of the research team. In step 5, the individual maps were reviewed by those interviewed.

Step 6 utilised the feedback from those interviewed to modify the individual maps and develop a composite map, reflecting key ideas from the stakeholders. Its purpose was to create a single, visual representation of the key ideas expressed in the individual cognitive maps produced by each stakeholder. The procedure for developing a composite map involves integrating similar themes from each individual map into common themes. This approach enables a more comprehensive understanding of stakeholders' needs, resources and patterns.

3 | Findings

3.1 | The Cognitive / Composite Themes Derived From the Engaged Stakeholders

In total, across the original 17 individual maps, 278 concepts were extracted. Amongst these, 186 were identified as “duplications”, of the same idea but with differing wording. For example, “A need for a healthier community”, “Health and wellness”, and “Overall community wellbeing” were merged under the phrase “Community health and wellbeing”. Consequently, these 186 “duplications” were condensed and merged into 38 concepts that captured the key ideas of the 17 stakeholders to develop the composite map data. These 38 concepts were mentioned by at least two of the stakeholders.

The individual maps generated in this study provided a detailed representation of the existing food system in the region and proposed an integrative model aimed at establishing a complementary “local food for local people” system, with the goal of enhancing the sustainability of food systems within the area.

The most frequent theme across the cognitive maps was “community engagement”, discussed by 65% of the stakeholders. Fifty-nine percent of stakeholders referred to the importance of health and wellbeing within the community, alongside the necessity for “robust and innovative designs” within the food industry. Fifty-three percent of the stakeholders discussed “inflation and expense of food”, “local networks and partnerships”, and the importance of “mātauranga Māori (Māori knowledge)” being implemented within the realm of agriculture. Forty-seven percent of stakeholders included the significance of “Location”, “Impacts of natural disasters”, “Food education”, and “Current distribution systems”. Of the 38 concepts, 21 were used in the composite map as they had a strong causal link to the development of a local, “sustainable food system”. The other 17 concepts, whilst expressing an important issue for those interviewed, had limited relevance to sustainable food systems.

Figure 3 presents the causal links between drivers, actions and the desired outcome of a local, sustainable food system. For example, “Local and community-focused business models” supports greater “community engagement”, the development of “nurturing networks and relationships with similar regional industries” and “Education Pathways for Smaller Growers” “Education pathways for smaller growers” emphasises the importance of equipping smaller growers with the knowledge and skills necessary to grow their business, “capital access for local growers”, and for supporting “Food Education within the Community—the Whakapapa of Your Kai (genealogy of food), that is, educating the community about the origins and heritage of their food. This then supports the growth of “mātauranga Māori and kaitiakitanga” supporting the growth of traditional ecological knowledge and sustainable practises in modern food systems. These actions lead to cultivating a “Passion for All Things Food” within

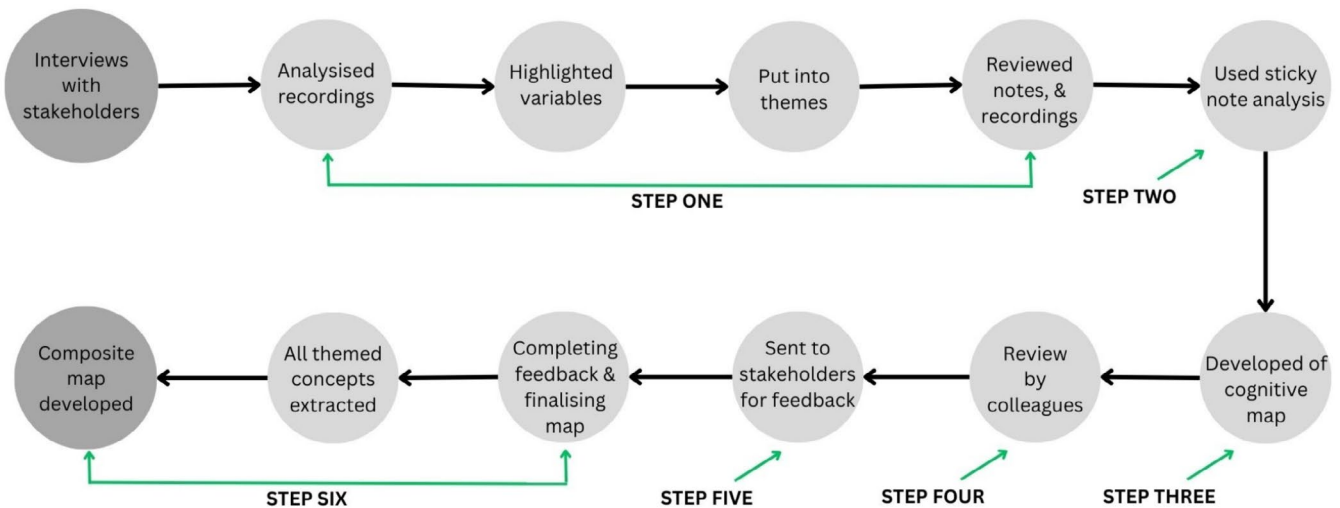


FIGURE 2 | Step 1–6 interview analysis map.

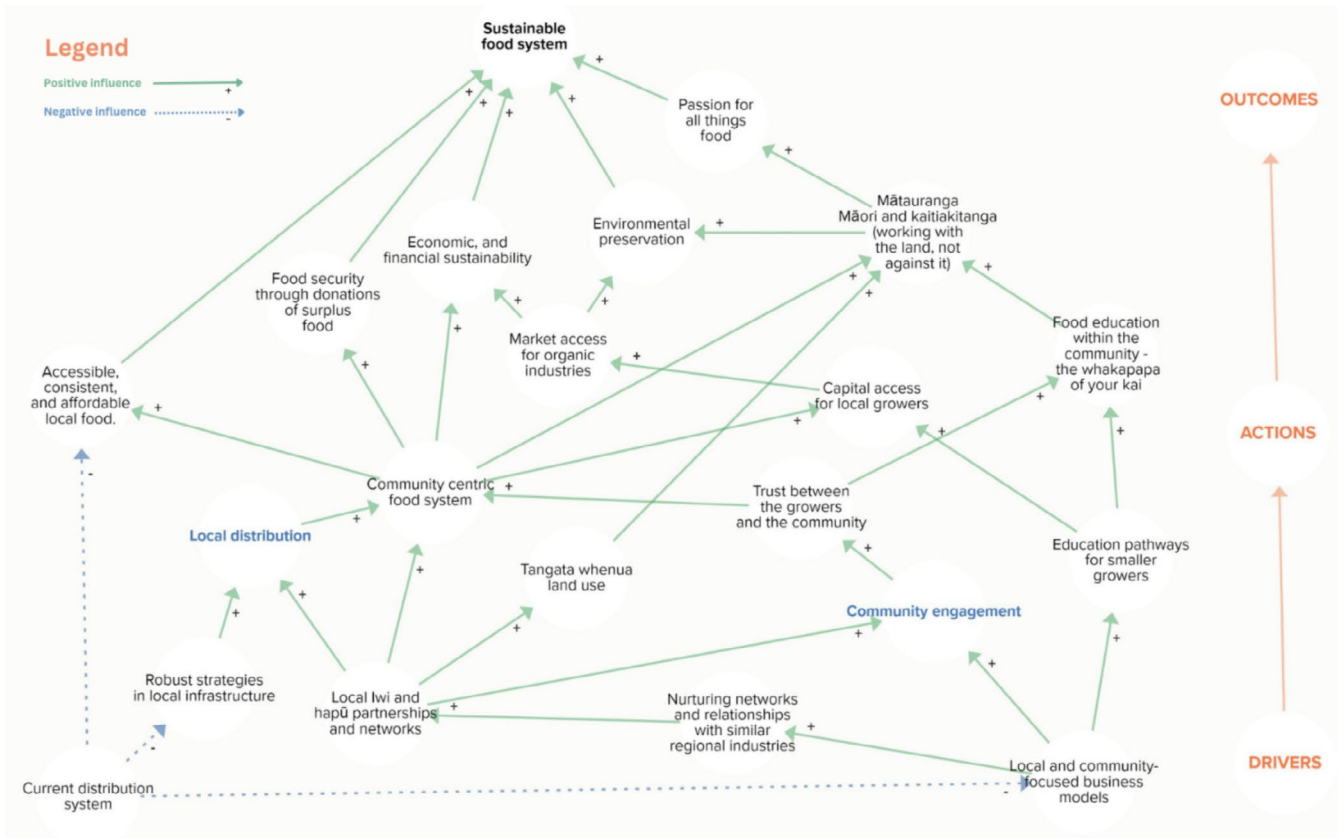


FIGURE 3 | Composite map.

the community. This passion includes appreciating food’s cultural, nutritional and environmental significance and promoting local food initiatives. This passion, along with four other key concepts, —“accessible consistent and affordable food”, “food security through the donations of surplus food”, “economic and financial sustainability” and “*environmental preservation*”—contribute to the development of a “Sustainable food system”. This composite map describes the many causal pathways that interact to deliver the overall outcome of a “*sustainable food system*”.

3.2 | Key Intervention Points

This section describes in detail two key concepts in the map: “*Community engagement*” and “*local distribution*” that emerged as key interventions and were given high priority by those interviewed.

3.2.1 | Community Engagement

Community engagement surfaced as the predominant theme across 11 interviews, underscoring its importance in driving organic marketing, foster trust between growers and consumers and promoting education on food within the community. As one stakeholder noted “The key to unlocking the future is around fostering partnership” and “We really need to come together as we all seem to be sharing the same issues.” These sentiments highlight the shared understanding amongst stakeholders of the

need for collective action and collaboration to address mutual challenges within the community.

3.3 | Composite Cognitive Map Focus on Key Intervention #1—Community Engagement

Figure 4 extracts the key concepts connecting community engagement to the sustainable food system. Illustrated are 10 key concepts that contribute to increased productivity of the sustainable food system. These concepts shed light on the interconnected concepts shaping community dynamics. The first variable highlighted was the importance of “*Local Iwi (tribe) and hapū (subtribe) partnerships*” which emphasise the significance of cultivating relationships with Indigenous communities, envisioning a more collaborative approach to land stewardship. These alliances were discussed to not only facilitate economic opportunities for communities but also underscore the imperative of environmental preservation and pest management. The variable of “*Local and community-focused business models*” highlights the value of family-owned enterprises. These models differentiate between familial, communal and Iwi ownership, but all emphasise the quadruple bottom line: community health, environmental sustainability, local economic development and Māori culture, rather than focusing solely on profit. This approach strengthens the bond between businesses and the community by promoting cultural synergy, future community wellbeing and meaningful engagement opportunities. These two concepts, “*Local Iwi and hapū relationships and networks*” and “*Local and*

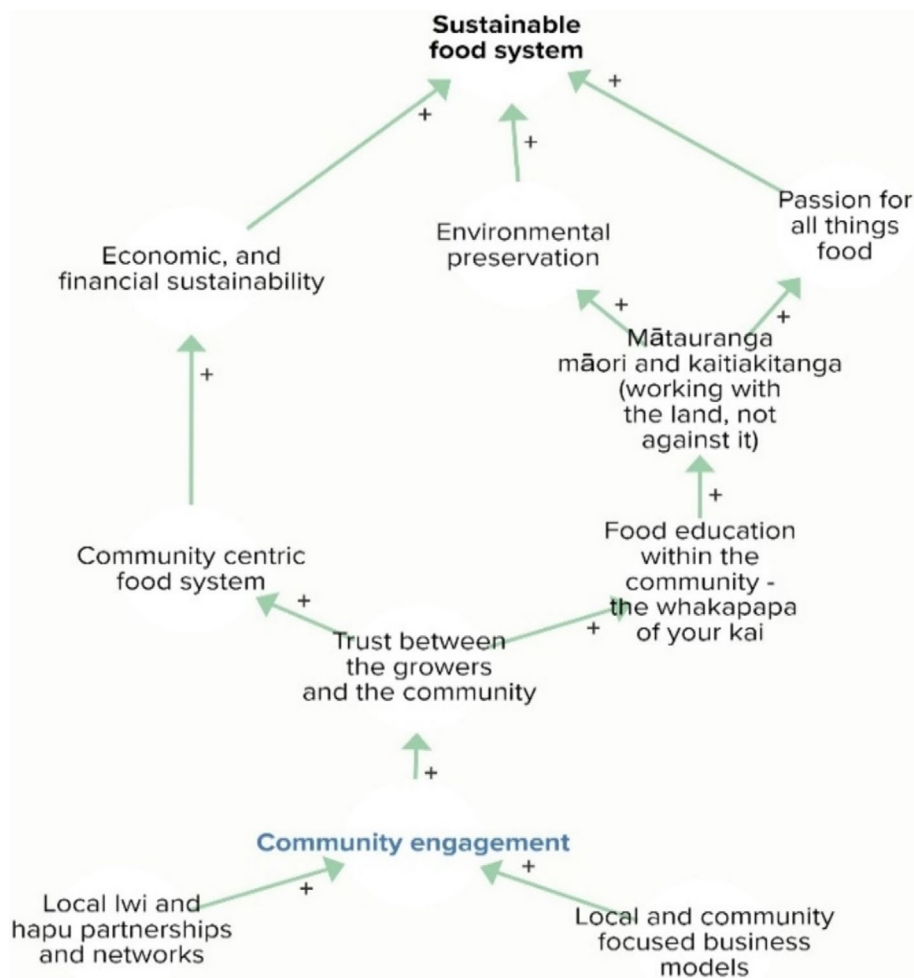


FIGURE 4 | Community engagement concepts.

community focused business models” contribute to increasing “*Community engagement*”.

The outcome for increase of community engagement will boost the “*Trust between the growers and the community*”. This variable, demonstrated within the map, is an important aspect to sustainable food systems. Establishing trust between growers and consumers requires personal connections and time investment, emphasising the importance of understanding and respecting community culture. Building this trust not only fosters stronger connections but also promotes education within the community, nurturing a deeper appreciation for the food ecosystem.

Through trust, both “*Community centric food system*” and “*Food education within the community—the whakapapa of your kai*” is enhanced. The food education highlights the need for food genealogy awareness amongst individuals and organisations. Understanding the origins and cultivation processes of food fosters a nutrition-conscious community. Through educational resources and workshops, communities can deepen their understanding of food systems, fostering greater engagement and informed consumer behaviours. Together, these factors form a comprehensive framework for understanding and enhancing community engagement, emphasising collaboration, sustainability and cultural awareness.

Through these pathways, enhanced through trust, an outcome path of “*Economic and financial sustainability*” is then highlighted, emphasising the importance of efficiency and productivity. By achieving economic stability, communities can better adapt to change and fulfil social responsibilities without undue financial pressure. This stability enables a more conducive environment for community engagement and collaborative initiatives.

Lastly, with the implementation of the variable noted, “*Mātauranga Māori and kaitiakitanga (working with the land not against it)*”, the enhancement of “*Environmental preservation*” and “*Passion for all things food*” will be increased as an outcome of the principles of kaitiakitanga (guardianship and protection). Thus, alongside “*Economic, and financial sustainability*”, this casual pathway can deliver the desired outcome of a sustainable food system.

3.3.1 | Local Distribution

The establishment of a local distribution system emerged as a key objective within the community to fulfil the aspiration of increasing locally sourced food for local people. This variable was seen as crucial in fostering social responsibility, enhancing community engagement and improving operational efficiency.

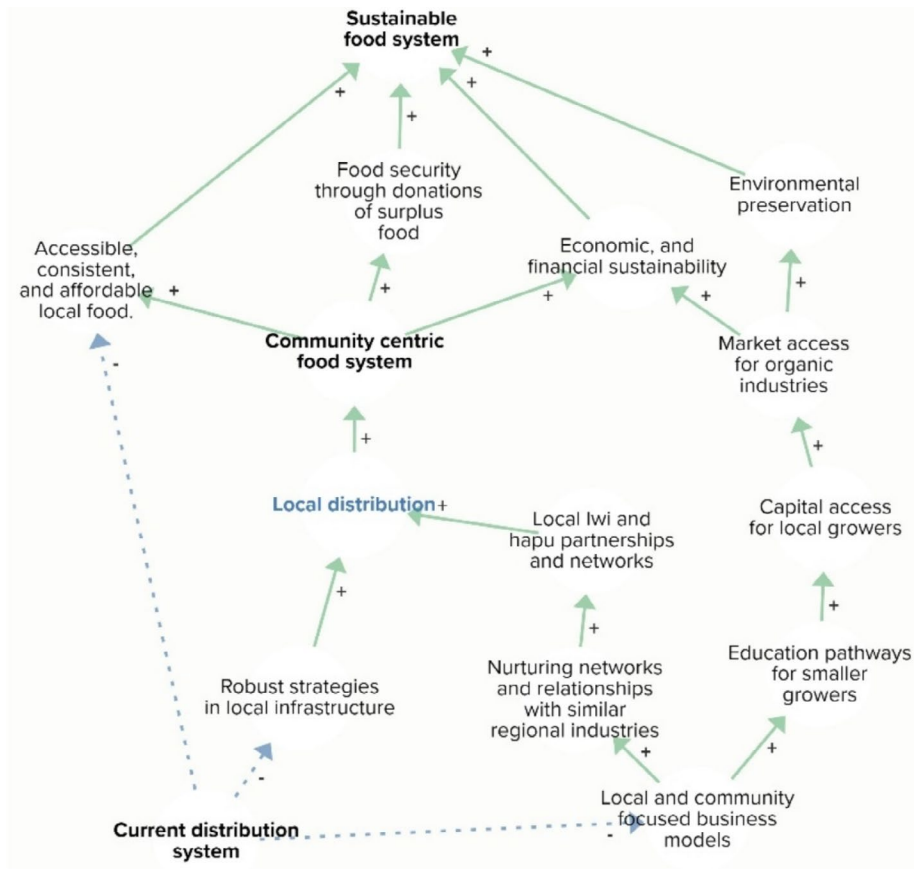


FIGURE 5 | Current distribution.

This was supported by comments from a local education adviser stakeholder:

We need a [local] distribution hub that sources food locally only and can also charge food that cannot be accessed locally, but everything that can will be sourced locally. I believe it would generate massive opportunities in all assets, and in the school's point of view, we would have a supply distributor who will understand our needs because they will understand the program and understand the needs for our schools and children.

Stakeholders felt that this imbalance of trust for the local distribution system could translate into reduced productivity and diminished social responsibility within both the community and relevant industries. Further evidence for this was extracted from our stakeholders; 47% highlighted concerns regarding the unreliability of the oligopoly in retail supermarket's systems or the absence of a community distribution network capable of facilitating surplus deliveries for charitable causes and community initiatives. Thus, the prevailing current state of supply of locally sourced food from the region indicates inefficiency and a lack of reliable infrastructure.

Stakeholders desired a higher percentage of locally sourced food to be circulated within the region. It was understood that the best narrative to achieve this is by developing a local distribution system. This desired distribution system should differ from

existing ones that currently influence the food system. This is discussed further in the discussion section.

3.4 | Composite Cognitive Map Focus on Key Intervention #2—Local Distribution

Figure 5 illustrates the importance of “local distribution” in developing a sustainable food system with an emphasis on locally sourcing food for local people.

The driver of this map is the “Current distribution system”. Stakeholders expressed the lack of responsibility and reliance of the current distribution, thus demonstrating the negative influence this variable has within the connected paths. For example, “Robust strategies in local infrastructure” represented by a solid line and a positive impact (+), influences “Local distribution”. Thus, indicating the importance of efficient and effective distribution networks within the community. “Local Distribution” is highlighted as a critical variable, playing a big role in the enhancement of the “Community-centric food system” variable.

“Local Iwi and hapū partnerships and networks” again provide a path of envisioning a collaborative approach to land stewardship, thus generating an efficiency to a community-centric food system.

At the core of the map is the location of a community-centric food system which directly benefits from local distribution. This community-centric food system is based on the co-design to create a cooperative link between food producers and consumers,

fostering a mutually beneficial relationship within the food system. The desired system could support sustainable food systems through donations of surplus food, addressing both food availability and waste reduction.

The “Economic and financial sustainability” variable is the connection that local sourcing supports economic stability within the community by creating jobs and supporting local businesses through a circular economy type model. Local and community-focused business models ensure that the economic benefits of food production are retained within the community, fostering economic resilience and sustainability. By focusing on local businesses, the food system supports organic industries and reduces the environmental impact associated with long-distance food transportation. Improving market access for organic industries and providing capital access for local growers ensures that local farmers can sustain and expand their operations. Through this, further education pathways for smaller growers further support local food production by providing the necessary skills and knowledge to thrive in the local market.

Thus, by focusing on accessible, consistent and affordable local food, food security through donations, environmental preservation and local economic and financial sustainability, this path aims to build a more sustainable food system.

4 | Discussion

This paper discusses the use of cognitive mapping to capture community stakeholders' perspectives on barriers and aspirations for sustainable food systems in Hawke's Bay. The process emphasised co-design principles, focusing on understanding community needs by involving food growers, manufacturers, retailers and communities. The study explored the potential environmental and community benefits of a broader sustainable food system approach.

The engagement of community players and the establishment of a local distribution system are considered by the community to be the most important elements needed to create a local sustainable food system. Our use of cognitive mapping also revealed that a community-centric food system should specifically highlight partnerships with local Iwi and hapū and support local and community-focused business models and their economic sustainability. Education about the whakapapa of kai also scored highly in stakeholder feedback. The feedback from our stakeholders highlights that understanding the whakapapa of kai involves appreciating the history of the land and the food it produces. Stakeholders noted that when they understand the genealogy of the food they consume, grow, or distribute, they develop a deeper respect for both mātauranga Māori and the food itself. This concept is illustrated in the composite map (Figure 3). These elements contribute to the food security of whānau (family), the efficiency of food distribution, ensuring surplus food reaches those in need and environmental preservation. Attention to local distribution, market access and education for growers will ensure that the community can sustain itself and thrive.

Enhancing community engagement, as we have found, and fostering trust between local growers and consumers is known to

encourage health-promoting behaviours and boost the overall health and wellbeing of the community [21]. Recognising and respecting the cultural nuances of the community is paramount in cultivating trust and fostering a deep connection between growers and the community [22]. The preferred path to change involves collaborative efforts between growers and community members, leading to beneficial economic growth for the entire region. By influencing a sustainable food system, this collaboration can secure a steady flow of revenue throughout the community, mitigating the impacts of external factors such as COVID-19, which disrupted economic stability in recent years [6]. This empowers the community to co-design efforts to sustain the food system, foster knowledge and education about the whakapapa of kai, and drive significant economic growth within the region. Community engagement was central in discussions with stakeholders concerning workforce needs, donations, trust amongst growers and networking opportunities with local Iwi and other stakeholders within the food ecosystem. Conversely, the feared consequence of no change represents a loss of connection between customers and suppliers, potentially ceding power to oligopoly markets. This scenario could limit market access for local growers, leading to larger organisations controlling local land and severing ties not only with local communities but also with the land itself [23].

The cognitive maps also indicated that increasing community involvement necessitates supporting family-owned businesses and ensuring their economic and financial sustainability. These concepts are interconnected, and improvements in one area are likely to have positive ripple effects on others. Additionally, supporting locally focused business models and enhancing economic stability within the community can create a more engaged local food network [24]. Educational initiatives about the origins and cultivation processes of food can deepen community engagement by fostering a better understanding and appreciation of the local food system.

The local distribution system was identified through the cognitive maps as a critical step towards improving the efficiency and sustainability of the food system. This system would serve as a hub for sourcing and distributing locally grown produce, enhancing the availability of fresh, local food to the community and reducing reliance on external markets. Thus, this initiative involves setting up a locally owned and operated distribution system that can efficiently handle and distribute surplus food to those in need whilst fostering community engagement [25]. This approach affords larger organisations the opportunity to contribute surplus goods without disrupting their current operations. Locally owned and operated distribution systems become a focal point for community engagement, facilitating conversations about the growers and fostering trust between producers and consumers [26].

This system could bridge the gap between growers and consumers, promoting trust and cooperation within the food ecosystem [25]. This serves as a primary metric for measuring community engagement and sustaining local grower networks throughout the region. Although additional action plans may be proposed to enhance efficiency, the lack of available data restricts such developments to theoretical frameworks at present. Conversely, the feared consequence of no change within the community

involves a continued reliance on large oligopoly transportation organisations, which are often unreliable for perishable goods, easily disrupted, and do not support local community-driven initiatives [27]. This scenario risks further alienating growers from the community and exacerbating food insecurity.

By employing cognitive mapping, we have enhanced our understanding of the stakeholders within the Hawke's Bay region, which is crucial for developing a community-centred approach to fostering a sustainable food system. Cognitive mapping serves as a powerful tool for visualising and analysing the complex network of relationships, perceptions and priorities amongst stakeholders [28]. This method allowed us to capture and interpret diverse viewpoints, uncovering both the barriers and aspirations unique to this region. The importance of cognitive mapping lies in its ability to facilitate an integrative approach [29, 30]. It highlights how stakeholders perceive their roles and interactions within the food system, revealing insights into the collective actions required to build robust local networks.

An example of how Suzanne Killing Wood's 2008 case study [31], *Asset-Based Community Development: A Case Study*, explores the implementation of asset-based community development (ABCD) in a disadvantaged neighbourhood. The ABCD framework emphasises identifying and utilising local assets—such as individual skills, talents and community resources—to empower residents and drive positive change from within the community. Through participant observation and in-depth interviews, Wood analysed the transformation within the community following the establishment of a new community centre.

Suzanne Killing Wood's initiative successfully brought the community together by focusing on its existing strengths and providing a central hub for collaboration. Rather than imposing solutions, the initiative emphasised local ownership by encouraging active resident participation in decision-making processes, which could influence policy to better support food sustainability. Community engagement in the case study was characterised by inclusivity, relationship-building and adaptability. Trust was cultivated through one-on-one conversations, small group discussions, and the celebration of local successes, reinforcing a sense of shared achievement and purpose.

Thus, future research should examine these key interventions through the ABCD framework and a stakeholder perspective to create a regional asset inventory. This approach will help identify community assets, address challenges, how and when community collaboration can occur, and offer insights into how policy can better support food sustainability [32] in the Hawke's Bay area. Ultimately, this research could provide an opportunity to develop a comprehensive action plan and regional food system map, guiding the region towards sustainable food system outcomes.

This approach ensures that our next steps are informed by a deep, contextual understanding of the local dynamics, paving the way for a more sustainable food system in Hawke's Bay. We acknowledge that, whilst there are many components to implementing a local sustainable food system, this work has highlighted what a specific community sees as important leverage points. By involving community members throughout the

process, we are fostering deeper engagement and collaboration, and interest in using the map as a basis for developing a long-term action plan.

5 | Conclusions

The cognitive mapping process helped us to reveal the community's priorities for building a sustainable food system. This approach has highlighted the importance of community engagement and the establishment of a local distribution system by integrating local Iwi and hapū, supporting family-owned businesses, and emphasising educational initiatives about the whakapapa of kai. The map offers a roadmap for enhancing community involvement and achieving a future where local food is abundant, accessible and valued. This strategy not only aims to bolster food security and improve distribution efficiency but also supports environmental preservation. Furthermore, incorporating Māori perspectives into the food system strengthens local networks, promotes culturally aligned business practises, and ensures that surplus food reaches those in need. This holistic approach fosters greater community resilience and economic sustainability.

Nomenclature

Hapū	subtribe
Iwi	tribe
kaitiakitanga	guardianship
mātauranga Māori	Māori knowledge
whakapapa of kai	genealogy of food
whānau	family

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Ethics Statement

Ethics approval was obtained from the Eastern Institute of Technology (EA09210623).

Consent

Written informed consent was obtained from all stakeholders in this study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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