

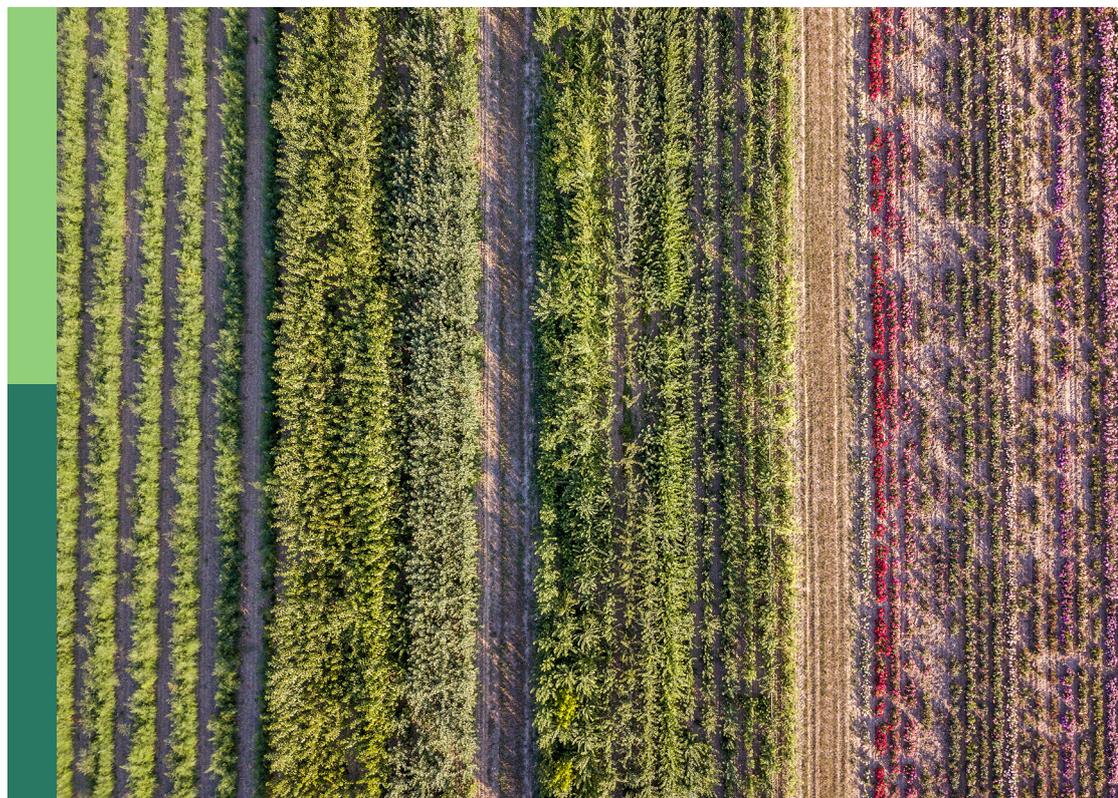
Alternative food networks for sustainable, just, resilient and productive food systems

Edited by

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and Simona Zollet

Published in

Frontiers in Sustainable Food Systems



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ISSN 1664-8714
ISBN 978-2-8325-5514-9
DOI 10.3389/978-2-8325-5514-9

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Alternative food networks for sustainable, just, resilient and productive food systems

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Citation

Vicente-Vicente, J. L., Egli, L., Zoll, F., Zollet, S., eds. (2024). *Alternative food networks for sustainable, just, resilient and productive food systems*.

Lausanne: Frontiers Media SA. doi: 10.3389/978-2-8325-5514-9

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OPEN ACCESS

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RECEIVED 02 September 2024

ACCEPTED 04 September 2024

PUBLISHED 19 September 2024

CITATION

Zoll F, Zollet S, Egli L and Vicente-Vicente JL (2024) Editorial: Alternative food networks for sustainable, just, resilient and productive food systems.

Front. Sustain. Food Syst. 8:1490031.

doi: 10.3389/fsufs.2024.1490031

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Editorial: Alternative food networks for sustainable, just, resilient and productive food systems

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KEYWORDS

regional food, alternative food system, food system transformation, local food, short food supply chain (SFSC), solidarity economy, food security

Editorial on the Research Topic

Alternative food networks for sustainable, just, resilient and productive food systems

The current globalized agri-food system model is increasingly recognized as unsustainable, as it undermines environmental health, social equity, and food security, as well as local food cultures and economies (Lähde et al., 2023). There is growing consensus around the need for a radical transformation of agri-food systems to increase their sustainability and resilience (McGreevy et al., 2022). Alternative food networks (AFNs) can contribute to building sustainable, just, resilient and productive food systems by incorporating local, indigenous and innovative knowledge and bringing together a diversity of actors to connect food production and consumption and create new practices and relationships around food. Despite an increase of AFNs globally, however, they remain a niche, and scientific evidence of their performance is still limited.

To address this gap, this Research Topic features 14 articles (see Table 1) that explore a broad range of AFNs, providing evidence from real-world case studies on their performance, operationalization, challenges, opportunities, and ultimately their potential for food system transformation. The investigated AFNs include local food buying clubs (Benedek), an island-based AFN (Black), alternative wine networks (da Rocha Oliveira Teixeira et al.), fresh stop markets (Denton et al.), multi-actor networks connecting food actors with local administration (Martens et al.), student-run campus food systems alternatives (CFSA) (Deskin and Harvey), community-supported agriculture (Egli et al.; Stehrenberger and Schneider; Verfuert et al.; Middendorf and Rommel), the teikei system in Japan (Kondo et al.), networks representing indigenous and peasant communities (Maysels et al.), charitable AFNs such as food banks and a community food market (Nayak and Hartwell), and a direct food purchasing network (Ušča and Tisenkopfs).

Major findings

The articles in the Research Topic highlight AFNs' contribution to transformation processes that occur on an individual, community and system level. Most articles point to the potential of AFNs for social transformation around food production and consumption, mainly by building social relations. AFNs create connections between producers and consumers (Stehrenberger and Schneider; Verfuërth et al.) that are often long-lasting (Kondo et al.), contribute to community-building (Benedek; Nayak and Hartwell; Stehrenberger and Schneider; Black) and create mutual solidarity and responsibility between the actors involved (Kondo et al.; Ušča and Tisenkopfs).

Furthermore, being involved in AFNs can connect people with traditional culture and knowledge (Black), contributing to its preservation (Maysels et al.). The connection with the region where food is grown is also often emphasized (da Rocha Oliveira Teixeira et al.; Verfuërth et al.; Black), implying opportunities for place-based transformation (da Rocha Oliveira Teixeira et al.).

AFNs also develop strategies and offer spaces to empower their members, supporting active food citizenship (Stehrenberger and Schneider; Kondo et al.). These strategies include transformative learning experiences (Deskin and Harvey), knowledge-sharing (Nayak and Hartwell), consumers contributing their skills (Nayak and Hartwell), educational programs for farmers (Denton et al.), but also learning that naturally occurs during participation, e.g., increased knowledge about food seasonality (Verfuërth et al.).

Empowerment can also be created through inclusionary measures. Although some initiatives may not reach low-income people (Egli et al.; Kondo et al.), other AFN models are more successful in strengthening food security (Nayak and Hartwell; Verfuërth et al.), food justice (Deskin and Harvey), and solidarity (Stehrenberger and Schneider; Verfuërth et al.). The local food clubs studied by Benedek successfully involved many low-income members, and Nayak and Hartwell show that community food markets can complement food banks and are a dignified way for marginalized people to gain access to food. The participation in CFSA and distributing produce at a local food security initiative increased the awareness of food injustice and motivated participants to increase accessibility to CFSA (Deskin and Harvey). Farmers also increased food security by raising solidarity funds or cooperating with local food charity partners (Verfuërth et al.).

While most transformation processes occur on an individual or community level, which can in itself be a leverage point for change (Deskin and Harvey), several authors reported beginnings of broader systemic change. Some AFNs can be considered grassroots movements actively challenging hegemonic structures (Maysels et al.). In some cases, farmers were motivated to invest necessary resources to redesign local food supply chains despite varying capacities (Martens et al.). Using organic and biodynamic production approaches also contributes to the sustainability and resilience of agri-food systems (da Rocha Oliveira Teixeira et al.), and from an ecological perspective such approaches often outperform reference systems (Egli et al.). AFNs also proved their resilience during the COVID-19 pandemic, being able to quickly adapt to disruptions and changing consumer needs (Ušča and Tisenkopfs). Results on the economic performance of AFNs such as CSA are still limited, but existing evidence indicates a high economic viability supporting a spread of these models and their

transformative impact (Egli et al.). Unlike the existing system, AFNs distribute capital instead of concentrating it, benefiting farmers instead of multinational companies (Benedek) and fostering local economic development (Nayak and Hartwell).

At the same time, even within one AFN model, such as CSA, there is a broad spectrum of typologies attracting consumers with different needs. This shows that AFNs are not homogeneous and still have potential to scale out and up and reach consumers with different needs (Middendorf and Rommel). The impact of AFNs is strengthened by coordinated action and networking (Benedek; Verfuërth et al.; Kondo et al.), e.g., with institutional actors: Martens et al. highlight the positive impact of local politicians promoting and legitimizing AFNs in their municipalities.

To drive food system transformation, however, AFNs must overcome several barriers. A common challenge is a lack of resources (da Rocha Oliveira Teixeira et al.), including limited access to funding programs (Egli et al.), educational opportunities for farmers (Denton et al.), and shortages of time, labor, and capital (Maysels et al.). Different obstacles also prevent farmers transitioning from conventional to alternative farming approaches, for example because they do not see sufficient potential in alternative ways of farming (Benedek) or feel unable to change their marketing strategies for reasons of age (Denton et al.). New entrant farmers and agricultural successors are often discouraged to (keep) working in agriculture because of the negative image of farming (Black). Furthermore, AFN actors often cannot fully escape market dynamics (Martens et al.; Maysels et al.), which forces them to act against their values to survive economically (Maysels et al.).

Finally, a lack of community engagement can prevent the success of AFNs (Benedek). If members do not actively participate, they are less likely to develop a sense of responsibility toward their AFN and more likely to leave (Stehrenberger and Schneider). The high dependence on volunteer labor, especially of women, can also lead to burnout (Benedek; Kondo et al.). Overall, there seems to be a trade-off between adjusting AFN practices to consumers' needs and maintaining AFNs original values. While a high effort to participate and a lack of convenience causes members to drop out (Verfuërth et al.), putting more emphasis on consumers' convenience may dilute the social movement orientation of some AFNs (Kondo et al.).

Conclusions

This Research Topic illustrates the broad variety of AFN models and their different approaches to fostering sustainable, resilient, and equitable food systems through local, indigenous, and innovative practices that build strong connections between producers and consumers. Taken together, these efforts highlight an array of strategies that can be mobilized to scale AFNs out and up and, ultimately, build more sustainable and resilient alternative food systems. When scaling, however, AFNs face various challenges within the dominant food system. Overcoming these barriers requires coordinated efforts among diverse stakeholders, better access to resources, and community and institutional support. Even more importantly, however, it requires a shift in discourse from achieving sustainability through incremental change and techno-centric solutions toward a transformational paradigm that centers principles such as sufficiency, regeneration,

TABLE 1 Overview on the articles included in the Research Topic.

Author(s)	AFN under consideration	Country/Region	Method(s)	AFN's contribution to transformation	Obstacles
Benedek	Local food-buying clubs	Hungary	Qualitative	<ul style="list-style-type: none"> - Local food becoming competitive with conventional food - Raising environmental and social awareness of consumers - Solidary practices that improve food security 	<ul style="list-style-type: none"> - Burnout of volunteers - (Economic) barriers for farmer participation - Lack of community involvement
Black	Alternative food production and consumption landscape	Sado island, Japan	Qualitative	<ul style="list-style-type: none"> - Focus on quality of life attracts and retains farmers - Social transformation through community-building - Increased connection to the local environment 	<ul style="list-style-type: none"> - Negative image of farming as barrier for farmer participation - Lack of societal awareness for the benefits of alternative farming - Disadvantages for peripheral farms - Lack of funding and knowledge
da Rocha Oliveira Teixeira et al.	Alternative wine networks	Tuscany, Italy	Qualitative	<ul style="list-style-type: none"> - Catalyzing innovation and collaboration - Adoption of sustainability strategies - Place-based transformation - Contribution to long-term viability of agri-food systems 	<ul style="list-style-type: none"> - Lack of resources and innovation capacity
Denton et al.	Fresh Stop Markets (FSMs)	Tennessee and Kentucky, USA	Quantitative	<ul style="list-style-type: none"> - Replication potential via on-farm education programs - Reduction of marketing costs - FSM farmers as role models for other farmers 	<ul style="list-style-type: none"> - Farmers' age as barrier to change marketing strategies - Limited access to education and information on sustainable Agriculture as barrier for willingness to participate
Deskin and Harvey	Campus Food Systems Alternatives (CFSA)	Montreal, Canada	Qualitative	<ul style="list-style-type: none"> - Participation fosters engaging with food-based injustices - Participation fosters community engagement with marginalized groups - Critical and transformative learning experiences 	<ul style="list-style-type: none"> - Limited focus on food injustice, critical reflection and beyond campus engagement
Egli et al.	Community-supported agriculture	Global	Mixed methods	<ul style="list-style-type: none"> - Positive sustainability performance of CSA - CSA outperform reference systems regarding various sustainability aspects 	<ul style="list-style-type: none"> - Lack of funding programs for CSA farms - Barriers for participation of low-income consumers
Kondo et al.	Japan's nationwide teikei movement	Japan	Qualitative	<ul style="list-style-type: none"> - Building solidarity-based consumer-producer-relationships - Fostering food citizenship 	<ul style="list-style-type: none"> - Increasing consumer convenience decreases social and political activism of participants - Teikei movement is not institutionalized which leads to low visibility and political power
Martens et al.	Public-private collaboration model	South Germany	Qualitative	<ul style="list-style-type: none"> - Public actors as drivers of social innovation aiming at food system transformation - Cooperation with institutional actors fosters AFNs - Farmers are motivated to contribute to transformation processes 	<ul style="list-style-type: none"> - Farmers' lack resources and knowledge - Farmers capacities to innovate are limited - Farmers are constrained by system logics
Maysels et al.	Local food system of small-scale producers	Andean region Cauca, Colombia	Qualitative	<ul style="list-style-type: none"> - Place-based transformation - Great interest by consumers and producers to expand direct purchasing - Building strong consumer-producer-relationships - Conservation of indigenous and traditional knowledge - Challenging the conventional food system and hegemonic power 	<ul style="list-style-type: none"> - Farmers are constrained by system logics - Farmers lack resources (time, labor, capital) to farm differently - High level of food insecurity leads to low demand for AFN schemes - Low-income consumers cannot participate in AFN
Middendorf and Rommel	Community-supported agriculture	Germany	Mixed methods	<ul style="list-style-type: none"> - Visibility of diversity is important for scaling up and replicating CSAs - Diversity of CSAs potentially makes CSA more attractive to broader social groups 	<ul style="list-style-type: none"> - Not all CSA types contribute to just and sustainable agri-food system transformation

(Continued)

TABLE 1 (Continued)

Author(s)	AFN under consideration	Country/Region	Method(s)	AFN's contribution to transformation	Obstacles
Nayak and Hartwell	Foodbanks and a community market	Leicestershire, Shropshire, and Dorset, UK	Qualitative	<ul style="list-style-type: none"> - Community markets can complement foodbanks - Improved access to healthy diets - Empowerment of economically disadvantaged people - Contribution to local economic development 	<ul style="list-style-type: none"> - Limited stock, bureaucracy and limited opening hours restrict food access
Stehrenberger and Schneider	Community-supported agriculture	Switzerland	Qualitative	<ul style="list-style-type: none"> - Active involvement in food production and solidarity practices - Community-building—contribution to a shift in practices, values and food citizenship 	<ul style="list-style-type: none"> - Lack of community involvement leads to decreasing responsibility
Ušča and Tisenkopfs	Direct purchasing (DP) networks	Latvia	Mixed methods	<ul style="list-style-type: none"> - High level of readiness, responsiveness and resilience in case of crisis - Rapid introduction of novel practices as a reaction to disruptions 	<ul style="list-style-type: none"> - Recovery processes after crises may include returning to previous practices
Verfuert et al.	Community-supported agriculture	Wales	Qualitative	<ul style="list-style-type: none"> - Improvement of food wellbeing and food security for low-income CSA members - Members build capacities and awareness around food - Building consumer-producer-relationships - Farmers engage in solidarity actions to increase food security 	<ul style="list-style-type: none"> - Unmatching produce and members' demands might lead to drop-outs

fair distribution, commoning, and care (McGreevy et al., 2022). The AFNs described in this Research Topic offer a promising starting point. Key priorities for future research will be to assess their effectiveness according to these principles, and to identify successful strategies for expanding these models and transferring them between different contexts.

Author contributions

FZ: Writing – review & editing, Writing – original draft, Formal analysis, Conceptualization. SZ: Writing – review & editing, Formal analysis, Conceptualization. LE: Writing – review & editing, Formal analysis, Conceptualization. JV-V: Writing – review & editing, Formal analysis, Conceptualization.

Funding

The author(s) declare financial support was received for the research, authorship, and/or publication of this article. This work was supported by JSPS KAKENHI Grant Number 21K20068 (SZ) and co-financed with tax funds on the basis of the budget passed by the Saxon State Parliament Grant Number 100595134 (LE).

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Acknowledgments

We extend our gratitude to all reviewers for their expertise and thoughtful feedback, which greatly contributed to the quality of this Research Topic. We thank María-José Ibarrola-Rivas for her support in the preparation of this Research Topic.

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McGreevy, S. R., Rupperecht, C. D. D., Niles, D., Wiek, A., Carolan, M., Kallis, G., et al. (2022). Sustainable agrifood systems for a post-growth world. *Nat. Sustain.* 5, 1011–1017. doi: 10.1038/s41893-022-00933-5



OPEN ACCESS

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SPECIALTY SECTION

This article was submitted to
Social Movements, Institutions and
Governance,
a section of the journal
Frontiers in Sustainable Food Systems

RECEIVED 15 December 2022

ACCEPTED 06 March 2023

PUBLISHED 23 March 2023

CITATION

Benedek Z (2023) On the transformative
potential of Hungarian local food-buying clubs.
Front. Sustain. Food Syst. 7:1124877.
doi: 10.3389/fsufs.2023.1124877

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On the transformative potential of Hungarian local food-buying clubs

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This study describes the development trends of local food-buying clubs (BCs) in Hungary and analyses how this type of grassroots initiative can contribute to the sustainability transition. BC are consumer-driven organizations which aim to connect local food producers with consumers. The study also discusses how the Hungarian implementation differs from other initiatives described in the literature. The empirical analysis employs qualitative techniques, including participant observation, in-depth interviews with three organizers and two external experts, and a survey of 82 BC producers. BCs may be instrumental in facilitating the sustainability transition: on the one hand, they reach a wide range of consumers, and on the other, they are in contact with a multitude of producers, so everything is in place for their successful scaling up, with a particular focus on the maintenance of core values. BCs can thus play an instrumental role in influencing attitudes and fostering community. One of their most significant advantages is that, while they can operate independently of the growth imperatives of the dominant capitalist paradigm, they can also be understood within it. The increase in the number of grassroots initiatives has led to the formation of a meta-organization aimed at generating and sharing knowledge and the joint utilization and development of specific resources, such as information technologies. The variety of organizational forms and operating modes allows the general approach of buying clubs to be tailored to specific micro-contexts. However, there is a potential danger associated with the large proportion of volunteer work. For BCs to be successful over the long term, it is vital that they are self-sufficient in terms of everyday economic activities and that organizers are at least partially compensated for their efforts.

KEYWORDS

sustainability transition, local food systems, alternative food networks, short food supply chains, ethical purchase groups, grassroot activist groups, Hungary

1. Introduction

In line with the Sustainable Development Goals, progress is required to create a just, resilient, productive and sustainable food system (UN General Assembly, 2015). This food system should provide sufficient food for everyone in terms of quality and quantity, offer reasonable compensation to farmers, and contribute to mitigating climate change. There is increasing recognition that alternative food networks (AFNs) can play a critical role in fostering a sustainable transition (Forssell and Lankoski, 2015; Sarabia et al., 2021).

Central and Eastern Europe are associated with exciting developmental pathways and dynamics regarding AFNs (Balázs et al., 2016; Goszczyński and Wróblewski, 2020; Kopczyńska, 2020). Interest in local foods is traditionally high and widespread. There is

a high rate of food self-provisioning, typically not driven by economic factors (Jehlička et al., 2021; Vávra et al., 2021). Furthermore, informal food economies play a significant role (Jehlička et al., 2020; Pinto-Correia et al., 2021). As a result of these processes, “quiet sustainability” may be achieved (Smith and Jehlička, 2013). However, farmers are usually reluctant to cooperate due to negative experiences during socialism, such as forced collectivization (Bakucs et al., 2012). An entrepreneurial approach among farmers is relatively rare, and many farmers seek solutions from a paternalistic state or other external actors (Bakacsi et al., 2002). Consequently, self-organization among farmers in the region is at a very low level compared to in Western European countries. As traditional farmers often lack the skills required to participate in AFNs, non-governmental organizations (e.g., consumer associations) are essential mediators (Balogh et al., 2022).

This study presents insights from Hungary, which has an established tradition of direct consumer-producer interaction through conventional markets, on-farm sales, and other initiatives (Benedek et al., 2018), although the development of modern AFNs is considered to have significant potential (Benedek and Balázs, 2016; Szabó, 2017). Hungarian local food-buying clubs (also known as consumer purchase groups, shopping communities, or basket communities) are voluntary organizations through which local food producers and buyers come into direct contact (Kápolnai and Molnár, 2020). Consumers select and place orders with community organizers on a weekly (less often, fortnightly) basis from a current product list or buy pre-packed boxes of vegetables and other food items. In recent years, the number of buying clubs has proliferated (Szabó et al., 2019), thanks to the commitment of organizations to knowledge transfer. A website (www.kosarkozosseg.hu) has been set up to help create new communities, suggesting that such Hungarian communities have embarked on the path of networking, which could lead to the exploitation of specific synergies. Additionally, buying clubs played an outstanding role after the outbreak of COVID-19 in terms of ensuring food security (Nemes et al., 2020), a phenomenon that appeared to be general among consumer-driven grassroots initiatives across the Global North (Wheeler et al., 2020; Fardkhales and Lincoln, 2021; Nemes et al., 2021; Meixner et al., 2022). The aim of this paper is to discuss the potential of buying clubs in relation to facilitating the sustainability transition in the long term, with a particular focus on recent networking activities.

2. Hungarian local food-buying clubs and other consumer-driven grassroots initiatives

The primary purpose of buying clubs (BCs) is generally to increase collective purchasing power (i.e., to facilitate the purchase of goods at lower prices) or to acquire products that are challenging to obtain independently (Martinez, 2010; Hupper et al., 2019). In addition, buying clubs may improve market relations by coordinating the activities of multiple actors (Morley et al., 2008). Nevertheless, there is a strong emphasis on ethics and the environment in the Hungarian local food context. The main aims

are to demonstrate solidarity with local producers (fair prices are accepted instead of low prices), revitalize the local economy, and obtain healthy, safe, and reliable food associated with the smallest environmental impact.

The pioneering Szatyor (“Shopping bag”) Association started as a box scheme in Hungary in 2005 with the goal of connecting urban consumers directly with nearby organic food producers (Perényi, 2009). According to Haldy (2004), box schemes can be characterized as food subscription systems. The distributor typically defines the range of products, and consumers have only a limited choice (Kummer and Milestad, 2020). In the Hungarian context, the scope of products usually expands until the box scheme character diminishes, or is wholly abandoned. Thus, consumers identify their own “box,” and no subscription or membership fee is required (Szabó et al., 2019); these systems can be termed food delivery schemes (Haldy, 2004). However, the local focus and importance awarded to ethical (and non-protectionist consumption, environmental, and other sustainability) aspects remains, as does the non-profit character (Svensson et al., 2019). Flexibility arrangements (no subscription is required, and the items can be flexibly chosen) make BCs similar to farmers’ markets operating online. The formation and management of such organizations usually depend on a handful of activists who are consumers themselves. Other BC consumers have only a loose connection with the organizations through their purchases; nevertheless, they often report a higher level of commitment to their buying community than patrons of farmers’ markets (Neulinger et al., 2020).

There are examples of well-documented consumer-driven local food-related initiatives in the literature. The following paragraphs discuss their similarities to and differences from Hungarian BCs. The Italian Solidarity Purchase Group (SPG) network is a well-known example. A comparison of SPGs to Hungarian BCs reveals characteristic differences, despite the diversity of the former. SPGs are more idealistic and often politically motivated (Brunori et al., 2012). Although organizationally there is a great variety of the latter (Barbera et al., 2020), SPGs are intended to be small in order to promote a democratic attitude and personal relationships among members (often groups of friends or colleagues), who often undertake management duties (Fonte, 2013). Hungarian BCs are typically more formal; their organizational structure is always hierarchical; individual customers interact with the association. SPG members are perceived to operate on a relatively tight budget and prices in an SPG are lower than in conventional markets (Fonte, 2013). In contrast, prices in Hungarian BCs are usually higher than in conventional retail outlets (Szabó et al., 2019), although perhaps lower than at organic shops (Svensson et al., 2019). Similarly to SPGs, many producers who sell through Hungarian BCs employ organic production practices, although they are only sometimes certified. All the differences between the producers and their practices are clearly communicated, and consumers can choose based on their preferences. Producers participating in BCs often consider this marketing opportunity to be part of their risk-sharing strategy and may have other sales channels where most of their produce is sold (Benedek et al., 2020a). Many BCs organize yearly farm visits, which is an essential element of control for consumers and enhances trust in producers,

similar to their Italian counterparts (Cembalo et al., 2013). In Italy, the rapid spread of SPGs after the appearance of the first one in 1994 made the participation of consumers living further away from main cities possible (Cembalo et al., 2013). The same process is also being experienced in Hungary, with the formulation of newer consumer communities.

Compared to Anglocentric, Scandinavian, or Polish non-profit consumer food cooperatives (as discussed by Deller et al., 2009; Pearson et al., 2011; Katchova and Woods, 2013; Bilewicz and Spiewak, 2015; Thorsøe and Kjeldsen, 2016; Kopczyńska, 2017), Hungarian BCs require no membership fee nor work for the community. Consequently, members do not directly influence their management or logistics. On the other hand, community managers (often volunteers) are consumers themselves; additionally, consumer feedback is regularly collected, and thus the opinion of consumers is articulated. BCs usually operate through pick-up points; the emphasis is always on the hand-over of pre-ordered items. Thus (except for the flagship Szatyor Association), no grocery shops nor de facto farmers' markets are associated with them.

Consumer-driven community-supported agricultural schemes (CSAs) and their French counterparts (AMAPs: *Association de Maintien de l'Agriculture Paysanne*, Associations for the Support of Peasant Agriculture) are an additional point of comparison. Similarly to Hungarian BCs, these systems operate on a non-profit basis. However, no subscription, contracting, or payment in advance is required in Hungarian BCs; thus, consumer commitment is definitely lower (Lagane, 2015; Neulinger et al., 2020). CSAs and AMAPs, as a consequence of the subscription approach, typically supply products using pre-defined boxes with a more or less standardized selection of produce. The CSA movement is also present in Hungary (Kis, 2014; Balázs et al., 2016; Birtalan et al., 2020), with schemes typically being farmer-initiated.

3. Understanding alternative food networks and their transformative potential

Various definitions of alternative food networks (AFNs) exist (Corsi et al., 2018). This is hardly surprising as the term "AFN" is an umbrella one (Nemes et al., 2023). In some cases, AFNs are referred to as the production, processing, marketing, and consumption of food based on sustainable practices (e.g., Seyfang, 2006; De Bernardi and Tirabeni, 2018; Savarese et al., 2020). Others challenge the concept by identifying trade-offs between the different dimensions of sustainability (e.g., Nousiainen et al., 2009; Migliore et al., 2015; Möllers et al., 2022), and emphasize territorial considerations (Brunori, 2007; Harris, 2010), relationships (Marsden et al., 2000; Renting et al., 2003; Kneafsey et al., 2013; Chiffolleau et al., 2019), values (Goodman et al., 2012; Pascucci et al., 2016; Fourat et al., 2020), or quality aspects (Brunori, 2007). There is a tendency in the literature to describe AFNs as being in opposition to conventional, globalized and industrialized food systems (Michel-Villarreal et al., 2019). As Tregear (2011) pointed out, AFNs are often defined by what they are not instead of what they are, in the sense that the term "alternative" is used purely

to express their differences to the "conventional" food system (see also Lamine et al., 2019). According to Maye and Kirwan (2010), the concept of "alternativeness" is contextual, thus, the independent analysis of initiatives is called for. To address the definitional problems and the complexity of AFNs, some authors (e.g., Jarosz, 2008; Tregear, 2011) approach the concept through the identification of broad characteristics.

Acknowledging the diversity and context-dependence of AFNs, this paper applies an understanding of AFNs based on the approach of Forssell and Lankoski (2015), who provided a broad and inclusive identification of AFNs based on their dominant features. (1) Background characteristics include participants' non-conventional sources of motivation regarding values and sustainability. (2) Core characteristics include greater product specificity and mode of production, referred to as "the economies of qualities" (Callon et al., 2002). Additional features include the diverse domains of proximity (Eriksen, 2013), from food geographies to market relations between producers and consumers. (3) As a result of these background and core characteristics, outcome characteristics include strong relationships among the stakeholders of AFNs. Buying clubs make diverse sustainability ("alternativeness") claims; any or all the characteristics of AFNs identified by Forssell and Lankoski (2015) may be addressed.

The general challenge facing AFNs is how to transform the much larger conventional food system, rather than simply inform it (Connelly, 2010). Through participatory and ecological practices, transformative organizations aim to scale up AFNs to induce regime shifts (Pereira et al., 2020); their goal is to build a food system that is sustainable and autonomous. Some authors suggest that consumer-driven initiatives, such as buying clubs, have the potential to efficiently scale up AFNs by being the "missing middle" between small-scale farms and mainstream markets (Blay-Palmer et al., 2013; Milestad et al., 2017; Brislen, 2018; Kummer and Milestad, 2020). In addition, grassroots initiatives can aggregate products in a cost-efficient way, including by reducing of transaction costs (Paech et al., 2021), increasing volume, and to exploiting the economies of scope in a way that is compatible with that of conventional food systems (Day-Farnsworth et al., 2009).

Wittman et al. (2012) argue that an increase in the popularity and sales of AFNs may risk "conventionalization," including the emergence of power imbalances or harmful environmental consequences. The latter suggests that authenticity might be an important protective factor against adverse impacts. However, expansion, the greater involvement of family farms and more interested consumers will not always result in scaling up and (more importantly) transformation if the core values (such as resistance to commodity fetishism) are challenged (Forssell and Lankoski, 2015), or if AFNs remain the playground of affluent consumers (Beckie and Connelly, 2016). Tregear (2011) points out that one problem related to AFNs is the premise that they are inherently beneficial from a social, economic and ecological perspective. The so-called "local trap" describes the intuitive perception of AFNs as "good" without a thorough assessment of the extent to which they challenge conventional food practices (Born and Purcell, 2006; Michel-Villarreal et al., 2018). In this paper, the neutral approach of Corsi et al. (2018) is adopted to avoid taking a position on this issue. Accordingly, this study seeks to increase understanding of how Hungarian local food-buying clubs function in relation to

the context of AFNs, and to assess their transformative potential without exaggerating their virtues or ignoring their shortcomings.

4. Materials and methods

Since the Hungarian buying club movement is still relatively small, comprising around 25 active communities as of July 2022 (and about 30 in November 2022), a mixture of three qualitative approaches was applied—the methods being those most widely used to study AFNs (Michel-Villarreal et al., 2019). First, the technique of complete participant observation was borrowed from the ethnographic toolbox, complemented by in-depth interviews with three BC organizers and representatives of two non-governmental organizations (NGOs) who were familiar with and supportive of the sector. As part of the third approach, 82 semi-structured telephone interviews were conducted with farmers who supply BCs. All respondents provided informed consent for their participation in the research, which was approved by the Ethical Committee of the Center for Economic and Regional Studies (CERS), Hungary (Reference number: 21/02; 04/01/2021).

Complete participant observation comprised two events. The first was a networking event of Hungarian BCs in March 2022, attended by representatives of 13 communities, while two further communities provided data in response to questions asked in advance. These organizations account for about half of the total sample. The author of this paper visited the networking event as a representative of one of the BCs, and experiences at this meeting inspired this research. The approval of BC managers with respect to the publication of their data was obtained later, when the idea of this paper was conceived. Anonymization of the data ensures the privacy and confidentiality of the participants; letters are used to indicate individual BCs. The second event was a facilitated roundtable discussion that took place in September 2022 as part of a series of discussions about post-growth strategies organized by the Human Ecology Master Program at Eötvös Loránd University, the MTA-ELTE Lendület New Vision research group, and the Sustainable Development Presidential Committee of the Hungarian Academy of Sciences. The discussion focused on the possibilities of restructuring the food economy, with the participation of a buying club organizer and two farmers who sell through short food supply chains; the author of this paper acted as a moderator. The discussion (like other events in the discussion series) was recorded and then coded thematically.

The in-depth interviews were designed to complement the participant observation experience. Interview subjects were selected through purposive sampling (key informant sampling), based on the prior experience of the author as a BC organizer. Concerning the organizers of BCs, the main criterion for selection was ensuring that organizations from various backgrounds (size, mode of operation, age, and different municipalities) were represented. Two further in-depth interviews were conducted; one respondent was a representative of an NGO that provides legal advice to and conducts research on the actors involved in AFNs and runs training courses for organizers of AFNs. The other organization provides pro-bono marketing advice to BCs. After approval by the respondents, the in-depth interviews were

recorded. Participants could refuse to answer or stop the interviews at any time. Participants were also informed about the method of recording and how the data would be stored. The interviews were thematically coded.

The local economic structure and history of a settlement influence the image and mode of functioning of an emerging community. The first participant observation exercise created interesting insights into problems associated with the recruitment of farmers. In Hungary, some farmers have preferred to supply wholesalers as opposed to BCs, the latter which may generate more profit but only meet individual needs and involve small orders—thus, some communities failed to launch. According to the agricultural censuses (Hungarian Central Statistical Office, 2021), the number of farmers has dropped from more than 1,395,000 (1991) to <228,000 (2020). The decreasing number of (small-scale) farmers and their lack of capacity for (or interest in) joining modern food distribution channels (Balogh et al., 2022) appears to be a major threat to scaling up; some organizers reported difficulty finding enough farmers willing to supply their BCs. Therefore, the views of farmers about BCs are important for making assessment about the future potential of the movement (an analysis of the attitudes and preferences of BC consumers is presented elsewhere; Benedek and Ferto, under review).

Identifying farmers' perceptions of BCs was thus essential for validating the potential for scaling up. The mapping of opinions was aided by a database that was compiled during earlier research in 2021. This database included the contact details of farmers who had subscribed to the local producer database of an official body (e.g., the National Chamber of Agriculture) or an NGO (e.g., a Local Action Group within the EU-financed LEADER program for rural development) or who appeared on the website or in Facebook group posts of a BC. A list of the websites and organizations that were mapped is displayed in [Supplementary Table S1](#). The resulting database contained 1,514 records. A random generator was used to select producers for semi-structured interviews by telephone between January and March 2021. Respondents were assured that their views would be anonymized and classified into higher-level groups. They were also informed that they could refuse to answer or end the interview at any time. Financial resources permitted 224 short interviews (averaging 10 min each) with a response rate of 47%. Among other things, farmers were asked about the marketing channels they used to sell their products. This sample was further narrowed down to the 82 respondents who also marketed to BCs, regardless of sales volume. According to estimates from the website “kosarkozosseg.hu,” the number of producers that supply BCs was already more than 400 in 2021, meaning that 20% of the total population was included in the final sample. In the interviews, farmers were asked about their demographic background, the start and duration of their connection with BCs, their views about the advantages and disadvantages of this particular mode of sales, and their overall satisfaction with BCs. After taking notes of the responses, the opinions were classified into higher-order groups.

The gender and role of participants are shown in [Table 1](#).

Data analysis in qualitative research involves systematically looking for, categorizing, and analyzing observation notes, transcripts, and other materials to improve understanding of a phenomenon (Bogdan and Biklen, 2007). This study, being an

TABLE 1 Gender and role of participants.

	Variable	No of participants
Gender	Male	51
	Female	51
Role	BC organizer	16
	External expert/researcher	2
	Farmer	84
Total		102

exploratory one, used an inductive thematic analysis to identify emergent patterns (Byrne, 2022). General themes related to BCs' current position and trends were the focus, as well as the role of voluntarism, the collaboration of BCs with each other and their respective local institutions, and the relationship between BCs and farmers. Finally, the scaling-up potential and the transformative impact of BCs were assessed. Specific categories emerged through multiple readings of the transcripts, and constant revision and refinement of the category system (Thomas, 2006).

5. Results and discussion

5.1. Current status and trends

The first community to form in Hungary shortly after the millennium was "Szatyor," followed by a few other initiatives. At that time, the cohesive force between the groups was primarily a familiar "brand" (e.g., the Pécs Szatyor, Kecskemét Szatyor, and Debrecen Szatyor initiatives); pre-existing communities helped create new ones primarily by transferring experience and sometimes by helping establish contact with producers. Some of the newly established communities closed down, others were transformed into farmers' markets, and the sporadic communities that survived typically followed their own path. The constant evolution of different consumer-driven grassroots initiatives is not a Hungarian-specific phenomenon (Kondoh, 2015; Hupper et al., 2019; Kummer and Milestad, 2020).

The Nyíregyháza Basket Community, one of the largest and oldest organizations, was launched in 2013. The financial crisis of 2007/2008 and the following recession significantly increased emigration in Hungary (Bodnár and Szabó, 2014), including Nyíregyháza. Seeing a mass of friends leaving the city catalyzed the bottom-up organization of a series of community workshops, or talking sessions to think over the nature of the crisis and identify possibilities for halting negative processes.

The idea of launching a buying club developed organically, as a means of strengthening the local economy. . . . Some 25 people started to work on launching the Basket Community of the 70 citizens who regularly attended the meetings, and the Basket Community was organized within as little as three months, and it has been operating continuously since then.

The COVID-19 pandemic led to turmoil in the sector. Different convenience-related developments occurred in many communities (such as arrangements for credit card use at delivery points, the development of a user-friendly webshop, setting up home-delivery logistics, etc.). These initiatives were rolled out a little earlier than planned in order to take advantage of the increase in demand generated by the closures, to great success. Development was necessary, as consumers used to the convenience of conventional retail made similar demands of AFNs. In several cases, one of the barriers to engagement with alternative systems (in addition to the relatively high price of products) was found to be their lack of convenience (Feldmann and Hamm, 2015; Albrecht and Smithers, 2018). The big, albeit temporary winners of the rapid reorganization of distribution channels were pre-existing BCs: turnover multiplied from one moment to the next, and these types of AFNs played a very important role in maintaining food security (Nemes et al., 2021).

In many cases, the increase in interest generated by COVID-19 accelerated the launch of new communities, too. Coincidentally, preparatory work for these had often been long ongoing. (Although the momentum of the preparations of some other communities was halted by COVID-related closures) The flagship of the background work aimed at supporting the start-up of new communities was the Nyíregyháza Basket Community, which has been running training sessions for those planning to start organizing since 2017. One interviewee stated that:

We met at a training session that was organized for folks interested in launching their own communities. It turned out that there were several of us [from the same municipality], and later we were joined by 1-2 neighbors and kindergarten parents, so the organizing team quickly came together.

A remarkable training session was held in January 2020, shortly before the pandemic. Many communities were able to take advantage of a combination of inspiration from the training, the sudden increase in free time due to closures that could be used for organization, and the never-before-seen increase in demand.

Table 2 displays the main parameters of some of the communities for 2021. Data were collected during the first participant observation exercise. The number of communities was around 25 in the summer of 2022, and five or six more were expected to start in the autumn of 2022. In addition, the table lists the organizations that attended the network meeting in March 2022, or provided data in preparation for the meeting and did not object to its publication. These organizations include the BCs of Budapest's District 8 ("Vörösbegy Consumer Cooperative") and District 18 ("Végtelen Kosár"), Budafok, Gödöllo ("Dombvidék"), Dunaújváros ("Duna Kosár"), Tatabánya ("Gerecse Szatyor"), Kecskemét, Nyíregyháza, Pápa, Kaposvár ("Somogyi Kosár"), Szatyor Association, Szigetmonostor ("Sziget Kosara"), Szolnok, and Szombathely ("Vasi Zöld Kosár").

Most of the communities are located in the capital or county capitals. However, there are also communities from settlements with a few thousand inhabitants, such as the "Vértesi Kamra" (in Csákvár, 5,200 inhabitants) and "Etyek Szatyor" (based in Etyek, 4,000 inhabitants), which are not included in Table 2. The

TABLE 2 The main parameters of some Hungarian local food-buying clubs.

Code of BC	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Type of settlement	Village	Town	Town	Town	County capital	County capital	Capital	Capital	Capital	Capital				
Population of settlement (thousand)	1.7	25–50	25–50	25–50	50–100	50–100	50–100	50–100	100–150	100–150	1,700	1,700	1,700	1,700
Starting year	2020	2020	2021	2020	2020	2020	2020	2021	2011/2022 ^a	2013	2022	2020	2020	2005
Number of farmers	15	35	12	20	30	25	30	25–28	10 ^b	45	28 ^b	7	11	72
Number of consumers	15	20	25	30	35	20	35	63	40 ^b	140	25 ^b	30	35	140
Number of volunteers	4	8	22	15	22	2	5	n.a	6 ^b	24	6 ^b	12	3	26
Bi-weekly	No	No	Yes	No	No	No	No	No	No	No	No	Yes	Yes	No
Producers and consumers meet	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	No
Paid workers	No	No	No	No	No	No	Yes	No	No	Yes	No	No	No	Yes

Data refer to the year 2021.

^aAfter a few years, initial momentum ceased, the organizers experimented with other modes of sales, and the community was reorganized in 2022.

^bData from 2022.

smaller the municipality, the more difficult it is to run a BC: as consumers tend to know producers personally, the role of other direct sales channels (e.g., on-farm sales, barter) is proportionally more significant.

Some communities operate their pick-up points as pop-up farmers’ markets where customers can meet the producers and items ordered through the BC are handed over; the community thus coordinates only the flow of information. While this arrangement requires some additional time from the farmers (compared to arranging for volunteers to hand over orders), the former obtain access to marketing (and networking) channels, and BC management requires fewer resources.

5.2. Management of individual communities: The role of voluntarism and paid workers

Bottom-up processes, community-based learning, and cooperative learning are paramount in management processes. Prior planning, measuring and evaluating results, and self-reflection are critical elements.

There wasn’t a leader who knew how to do it, so we decided to become a learning organization: we would learn how to organize a buying club together. We planned, we implemented, we measured, we evaluated, and we redesigned...

Most organizations implement periodic surveys of their consumers and/or producers. Such periodic evaluations of the organizing core and redefining (shared) goals and visions help communities maintain their function and provide an opportunity to resolve any potential conflicts.

Based on data about experiences with organizational development, a core of at least three, but preferably five to six people is required for the stable, long-term operation of an organization. In other words, the key is not necessarily having a single charismatic leader but rather the cooperation of a small but relatively homogenous group of people with similar values. Most organizations rely heavily on volunteers in a variety of roles. Their primary (and often the only) incentive is the “value proposition,” which may be the sense of belonging to a community. The coexistence of paid employees and volunteers is typically acceptable in communities due to the high level of transparency. Most consumers are only loosely connected to organizations through their purchases.

Organizers are prone to burnout, so it is essential to compensate them for at least some of their efforts. However, the level of payment is a critical issue, as behavioral economics literature suggests that incentives that are too low in value can have the opposite effect, reducing motivation (Skinner, 1978; Itri et al., 2019). The networking meeting of BCs indicated that participation in such programs was a valuable source of inspiration for the organizers, and further consideration should be given to networking opportunities in the future (see also Section 5.3) as well as to organizational development at the level of the meta-organization.

Compensation is a double-edged sword when applied to employees. Payment is critical for the survival of BCs, yet introduces some risks, as one of the expert I interviewed explains:

If you get paid for your activity, it can trigger an urge, a kind of dependence. You start to think that you will be paid only when there is enough income. And then it may turn into a capitalist model, when the focus is on generating income, and that decisions must be made or steps must be taken that support this direction—even if they are not entirely compatible with the [original] values or the purpose. It's easy to go off track when you have this dependence on money.... [But] with a mature personality, and in a well-functioning community, this should not be a problem.

In line with earlier research that emphasized the dynamic nature of values (Milestad et al., 2017), the need for periodic reconsideration of the mission of the BC is undoubtedly necessary. In addition to having paid members, it may be pertinent to engage other volunteers who can ensure the continuity of the core value system in a variety of situations. Additionally, the post-growth logic of maintaining a small scale can be applied by organizers to determine what is “enough” in terms of capacity. A more detailed discussion of the transformative power and potential of communities is provided in Section 5.5.

5.3. Connections: Embeddedness and networking

Individual BCs are entirely independent of one another. Some farmers supply more than one community, but this is always the farmer's personal decision. In the life of Hungarian BCs, a significant milestone is the emergence of networking activities or the appearance of a meta-organization that offers a wide range of relationships. A shared website, kosarkozosseg.hu, and a related social media platform have been created to identify existing communities, making it easier for producers and consumers to join them and to act a starting point for those considering setting up BCs. Additionally, active communities communicate primarily through thematic mailing lists and occasional face-to-face meetings. A practical aspect of communication between communities is the sharing of knowledge. Furthermore, in-person meetings are also valuable sources of inspiration, as they allow organizers to experience belonging to a community outside their immediate BC.

A unique link between the organizations is created by a software implemented by the Nyíregyháza Community. This software, which is now being jointly operated by several organizations, is an exceptional platform dedicated to serving the needs of BCs through processing orders and deliveries. The platform also functions as a participatory quality assurance system (products are evaluated according to predefined criteria, including the location of ownership, location of the main ingredient, mode of production, processing, and waste generation). Organizers conduct this evaluation to help consumers make more informed and conscious decisions. Articles and blog posts can also be published through the platform that can be used to raise awareness. The

platform is modular, thus, local communities can select and customize the elements of relevance to them. The IT tool is currently used by approximately half of the communities (15–17 BCs), creating new opportunities. The software was previously developed by volunteers or on a project basis, but now...

communities that join pay a relatively small fee for the use of the software, in proportion to their turnover, and the amount that is collected covers the full-time salary of a programmer responsible only for developing the software, based on the requests that are received.

Participant communities also have access to the source code (for example, so local IT professional volunteers can make changes).

An additional community interface was provided by a marketing study group run by a volunteer professional (one of the interviewees) in the spring and summer of 2022, thus the emergence of the meta-organization fostered knowledge generation. Along with the links described so far, economic ties have also begun to develop between communities—for example, concerning producers supplying several BCs. Although it is not common practice, some farmers now sell exclusively through BCs (in addition to on-farm sales). Overall, the emerging meta-organization may help develop economies of scale and the further concentration of purchasing power.

For each community to be embedded, links with local institutions are crucial. These links take a variety of forms. For example, communities often benefit from volunteers' direct knowledge (human capital) or the broader social capital provided by consumers or producers closely associated with a BC.

We are lucky not to have to pay rent for the use of the pick-up point. Ms. X, the owner of the place, is an old friend of one of the organizers, and she liked the “cause,” so she invited us to use her company's site.

Besides discounted or free delivery venues, advertising space, and legal and food safety expertise can contribute to the management of a community. In addition to being useful at the early stages of development, these solutions can be of assistance during their growth.

For some BCs, the core of the consumer community is another stable community, typically a nearby Waldorf-school-related group. In such cases, the challenge may be to expand beyond this circle. The development of stable buying power is key to the life of any BC. There is ample evidence that the free opportunities available *via* social media can quickly isolate BCs in a bubble, hindering growth. If an organization expands at a different pace than a producer had envisioned, challenges may arise. In general, marketing is a critical aspect of community life: on the one hand, successfully managing this is very demanding, and on the other, values are crucial. As BCs typically seek to avoid the capitalist logic (see Section 5.5), marketing tools must be carefully chosen: a delicate balance must be struck between promotion and attitude formation. For this reason, personal contact and word of mouth are often used to attract new customers.

In many BCs, there is a strong emphasis on being present at local festivals and events, establishing positive relationships

with the local press, and launching a catering service. Establishing good relationships with various local institutions appears to be an essential element of both survival and expansion.

In the beginning, we often went to different authorities and asked questions—most of the time, they didn't understand what we were asking. Then there were inspections, and then they understood. And then, we developed a relatively good relationship with the Food Safety Authority.

5.4. Relations with farmers

A survey of BC farmers revealed that they have been supplying BCs for 4 years on average. Generally (~40%), farmers were contacted or invited to participate by community organizers or through previous acquaintance with the organizers (27%). Fewer business relationships were initiated by producers or at the invitation of a fellow producer (21 and 10%, respectively). New organizations often recruit farmers at nearby farmers' markets. Later, as an organizations become more established, the aim is to increase the assortment by directly inviting farmers to participate. Social media, the databases of organizations such as the Hungarian Chamber of Agriculture, NGOs, and nearby BCs are the most typical sources of contact information. It is also common for farmers to approach more mature BCs.

Interviews with BC organizers revealed that most BCs apply complex evaluation criteria when considering the involvement of a new farmer.

The quality of the product is of paramount importance. For us, this means minimal reliance on fertilizers and pesticides (none of our farmers are certified), ... and no use of additives in the case of processed products. We place emphasis on the content of food items, including the sources of ingredients.

Geographical aspects are also taken into account. The aim of providing a wide variety of products to allow customers to purchase all the essential household items they require through the BC often calls for compromise in terms of geographical distance. For example, many BCs do not apply a pre-defined geographical radius, but priority is awarded to farmers operating nearby, although others are stricter in this regard.

Farmers are highly respected partners. As one organizer explains,

Things should not be determined by profit, but let the producer be in the spotlight, the one who has really worked hard to ensure that the [product] reaches the people at the best possible quality.

According to another organizer,

Markets are deteriorating, and most of the time, it is no longer farmers who [directly] sell [see also Benedek et al., 2018]. That's why it's good to be here; you can show the producers in person.

BCs place importance on maintaining or improving the relationship between producers and consumers. New farmers are introduced on media platforms, and information about producers and production processes is available for all food items. Consumer feedback is constantly collected and organized; thus, farmers are informed about changes in demand. Recognizing the potential of community-building (i.e., that a sense of belonging to a community can strengthen the loyalty of both buyers and producers), several organizations are building awareness through organizing farm visits, harvest days, and other programs.

According to the survey results, several advantages are associated with BCs (Table 3).

For the BCs in the current sample, supply was driven primarily by non-financial interests, which aligns with previous findings (Benedek et al., 2020a). A majority of producers cited marketing benefits as the primary reason for supplying BCs—the fact that their products are accessible to a wider audience. The farmers emphasized that BCs are particularly good with online marketing and being present on social media, which is a weakness of many producers. Many producers liked that they could save time by not having to stand at a market stall all day. BCs are considered secure outlets by many producers. On the one hand, pre-ordering allows goods to be sold regardless of the weather, which always poses a risk in the case of markets; moreover, there are no unsold goods—a relevant factor in the case of perishable products. Producers reported that they liked and perceived BCs as communities. The participants believed that raising awareness is essential and that conscious consumers more highly value their products and the labor needed for their production. Moreover, they also felt a sense of belonging with other producers: many found it motivating to sell alongside others who produce authentic, high-quality goods. Additionally, they commented that dealing with organizers is more direct and personal than with the buyers at a market, allowing for the quicker identification of needs and smoother communication.

A more complex range of disadvantages was found for BCs, and clear-cut categories could not be identified. Several producers indicated that delivery times were lengthy (compared to at a wholesale outlet) and the assembly of individual orders was time-consuming and energy-intensive, with many opportunities for error. Some farmers indicated that they considered the sales commission paid by the producers to be large, and felt that the terms of some BCs were particularly unfair (e.g., if a price guarantee was required, meaning that they could not sell their products at a higher price than at a market). One solution would be to base the commission on profit rather than turnover (with the possibility of making a supporting contribution, allowing a producer to

TABLE 3 Benefits of BCs according to producers (N = 82).

Benefit	Proportion mentioned
Marketing	0.646
Risk sharing	0.5
Time saving	0.397
Monetary	0.171
Other	0.294

offer any amount). Some suppliers found it difficult to deliver to a regular or fixed delivery schedule. Some producers noted the low overall volume of sales as a disadvantage. Many farmers perceived that volunteers lacked capacity and were sometimes disorganized. Consumers occasionally failed to pick up their orders. To address this issue, many communities have various mechanisms, ranging from charging the association's budget to enforcing various sanctions. Sometimes, especially in young communities with a box system, the storage of goods between the points of receipt and sale is not adequately managed, resulting in conflict. An additional disadvantage of box schemes is that they do not allow for direct contact with the consumer. Some producers were dissatisfied that their products were not accompanied by an explanation with the same level of detail as if they were selling them personally. The issue of producers having to deliver even if only a few orders are received was raised by some producers. However, many communities have implemented order thresholds, which make cooperation more predictable and profitable for producers. Another difficulty affects producers of fresh products (e.g., bakery goods and dairy products)– when unexpectedly large orders of items are received, which results in a rush. One producer pointed out as a disadvantage that impulse buying does not increase turnover because products are preordered.

Table 4 presents descriptive statistics regarding satisfaction with BCs.

Overall, producers are satisfied with their cooperation with BCs, which is of great importance when scaling up is considered. Most producers either plan to continue supplying at a similar volume (30%) or expand soon (68%), indicating that even though their sales may be relatively minor, they take the opportunity seriously.

5.5. The potential of buying clubs for scaling up

Organizers with a long history of community activity agree that long-term operations must be self-sufficient in terms of everyday economic activities. External funding or a supportive environment provided by a network of contacts can be helpful at the start-up phase of a community. Nonetheless, external funding can quickly become a hindrance to operating because it obscures the real needs and potential of actors; i.e., it prevents organic growth. In addition to the need to cover the rent for a venue, organizations should at least secure the “employment” of organizers (the magnitude of the latter makes it more accurate to talk of fees) for a period of a few years, which can then be increased as the community grows. According to one expert:

TABLE 4 Satisfaction with BCs from the producer perspective.

Variable	N	Mean	SD	Min	Max
Satisfaction with BCs	77	4.62	0.81	2	5
Organizers are reliable	76	4.83	0.64	2	5
Processes are transparent	75	4.44	0.84	1	5
Shared goals	75	4.45	0.93	1	5

What I see is that in many communities, a lot of energy goes into the day-to-day running and organization, but less into strategic thinking. It's like, “if we have the time, we'll do it.” In this respect, it is the same pattern as in a small business... It is important to develop a core of organizers as fast as possible who can talk over strategic issues.

Barriers to scaling up include the burnout (and rapid turnover) of volunteers, the relatively high commission that farmers should pay, and, depending on the area, the lack of farmers who see the potential in participation, or can meet expectations (Balogh et al., 2022). In some instances, (especially in areas with weak purchasing power), the lack of dynamic community growth in the early stages of an initiative can be dangerous as it may cause the participating farmers to miss their targets and the community to fall apart before it has the chance to grow stronger. Networking may support the expansion of a movement and can contribute to the exploitation of economies of scale.

The number of consumers who believe that globalized consumer society is at a crisis point has increased due to recent wars, epidemics, and ecological crises, including climate catastrophe. One organizer summarizes their motivation as follows:

We are trying to do something. The “buying club” is a tool, a space to build the new economy.

Interviewees explain their expectations of an increase in consumer interest as being due to the intensification of these processes and believe that the role of BCs and their transformative impact will become increasingly critical. Such success is foreshadowed by the recent trend in Hungary for (formerly more expensive) local food to become competitive with that sold in conventional chains due to rising energy prices and a price cap on gasoline applied to private consumption (Sgaravatti et al., 2022). This relative decrease in prices is likely to accelerate the growth of the consumer base, although the pervasiveness of this trend remains a question.

This study has focused primarily on the organizers of BCs and, to a lesser extent, on producers. Consumers have only been partly addressed in conjunction with the other two stakeholder groups. One widespread criticism of AFNs is that their higher prices attract a relatively affluent audience (Martinez, 2010; Kneafsey et al., 2013; Balázs et al., 2016), despite attempts to highlight local products' excellent value for money. Although local production is not always organic, craft foods typically contain fewer additives than conventional products, a factor that is attractive to many consumers (Feldmann and Hamm, 2015). As a result of ongoing awareness-raising activities, the dominance of affluent shoppers is less apparent with BCs than in other modern AFNs. An organizer reports:

Many of our customers are low-income but conscious [environmentally and socially aware] intellectuals. They have small shopping baskets, but they always order.

The participation of disadvantaged and marginalized social groups in BCs is not typical, despite many organizations being

highly sensitive to issues of social inequality. For example, some groups collect food regularly or through campaigns to help needy families and organizations. Others maintain partnerships and participate in joint awareness-raising campaigns with other NGOs and social organizations. For example, several communities reported that they had organized fundraising activities to support refugees from Ukraine. The credibility and transparency of organizations are crucial to this type of community work.

Small-scale food systems, including BCs, can contribute to the transition to a post-growth world if their expansion occurs so long as their core values are sustained, and despite manageable risks related to conventionalization. Although BCs can be interpreted within the mainstream capitalist paradigm (which is relevant, since it applies to the development of connections among actors driven primarily by individualistic interests), their small scale and lack of growth imperative suggest their sustainability. What is “enough” for a small-scale farmer may be defined (e.g., the amount of land that can be cultivated in a day, how many animals a person can feed, etc.). Although most communities are still expanding, some have already reached their limits in terms of the number of customers they can comfortably serve. Additionally, although some communities are more permissive about their delivery-related footprint, farmers may personally define whether it is worth supplying the relatively small volumes of products (compared to other distribution channels). Thus, “enough” can be understood at the organizational level, too. Beyond being more independent of a pro-growth logic, BCs are also beneficial from a sustainability perspective since they tend to distribute rather than concentrate capital. As one participant of the facilitated roundtable discussion summarized:

The money goes into farmers' pockets, not those of multinational retail companies.

Additionally, even if AFNs do not necessarily boost the local economy (Benedek et al., 2020b), they certainly help to retain the population.

6. Conclusions

Based on participant observation, interviews, and a producer survey, this paper was written to improve understanding of the recent evolution and transformative potential of Hungarian local food-buying clubs (BCs). Rather than focusing directly on the various aspects of sustainability that are often difficult to quantify (Corsi et al., 2018), the functioning of BCs is addressed. By helping create a healthier, more resilient, and more inclusive food system, BCs are undoubtedly an alternative to conventional retail and its mass-produced, homogenous imports. These particular types of AFN represent an innovative way to look at the future of food. They advocate lifestyle change, food activism, experimentation, and sustainable food production.

Compared to other types of AFNs, the essence of BCs can be summarized as follows. First, they are more stable and predictable for farmers than standard markets because no surplus is created due to pre-ordering. Producers are exposed to greater risk than those associated with community-supported agriculture (CSA), wherein

consumers reserve capacity at the beginning of the season. Since CSAs are typically organized around a single farmer in Hungary (Balázs et al., 2016), BCs reach more producers; thus, the scaling-up effect is more pronounced. Additionally, markets and CSAs are associated with considerably greater sales volumes per farmer than BCs. Although not as much as with CSAs, BCs involve relatively close relationships between organizers and producers compared to other forms of AFN. Consumer cooperative models are not typical in Hungary, so there is no comparison to be made in this respect.

Social proximity, links between producers and consumers, and transparency are imperative in mediating trust and enhancing consumers' perceptions of food quality (Prigent-Simonin and Hérault-Fournier, 2005). While these processes help maintain authenticity (Wittman et al., 2012), BCs may reach a wide range of consumers, including less affluent ones and institutions. Through organized action and bargaining power, consumers can provide producers with valuable insights, such as how they would like food to be produced, processed, and packaged, which (given the large number of farmers who are involved) can facilitate faster change and more substantial transformation. The relationship works the other way around, too, by educating consumers about the importance of seasonality, food cultures, etc., which may result in dietary shifts.

The relatively small number of small-scale farmers who are willing or able to supply, and the fact that individual BCs play a minor role in the livelihoods of farmers prevents the emergence of power imbalances, the marginalization of farmers and thus conventionalization (Mount and Smither, 2014).

The efficiency of BCs might be attributed to the diverse ways communities contribute to reducing transaction costs (Paech et al., 2021). First, by including many farmers—farmers, who sell their own products, BCs can offer a wide variety of authentic food items; and by pooling the requests of many customers, they facilitate the provision of supply. Institutionalization enhances the cooperation of farmers in a context where collaboration is not typical (Bakucs et al., 2012). Compared to marketplaces, the application of strict and transparent evaluation criteria, and regular farm visits ensure that those who really produced the products come in contact with consumers (Benedek et al., 2018). The use of IT tools throughout the order and distribution process keeps transaction costs to a minimum (King et al., 2010). Finally, through a combination of awareness-raising and transparent communication, BCs mediate stakeholder trust. Considering the weak state of civil society and the low level of cooperation in Hungary, the importance of the work of BCs related to increasing community cohesion cannot be overstated.

Although the financial dependency of paid organizers risks forcing growth or growth at any cost, the presence of the value-based community and, more importantly, the well-defined geographical and capacity limits of individual BCs make this risk manageable. This ensures that core values can remain intact as communities grow and mature. The resulting transformative effect may be a result of the expansion of the movement or networking rather than the growth of individual BCs. This type of AFN may be particularly significant in the Hungarian context during sustainability transition.

Although BCs have a bright future, most such communities are still in their infancy, and are vulnerable due to the high proportion of volunteerism. Growing networks of BCs and annual meetings

could be valuable means of strengthening BCs in the immediate future. It remains to be seen if BCs can strengthen and fulfill their promising role. However, many current trends are encouraging the development of BCs as grassroots initiatives, including the climate crisis and the (sometimes greater) rise in the relative price of conventional products.

The contribution of this piece of work to the literature is twofold. First, the study attempts to fill a knowledge gap by describing the current state and prospects of a specific type of AFN in a region that has its own distinct development trajectory. Second, emphasis is placed on local food-buying clubs, about which there is limited knowledge compared to that about farmers' markets and community-supported agricultural schemes, in spite of the former's recent development and importance with respect to food security.

The research described in this paper is not without limitations. Most importantly, the author's involvement in complete participant observation may compromise its objectivity. In order to overcome this limitation and ensure rigor, additional research methods were employed. A further limitation is that the number of BCs is presently relatively small, and the majority of communities are young, so the generalizability of conclusions may be limited as the movement matures—suggesting an avenue for research. An additional interesting line of research would be an analysis of BCs from the perspectives of marginalized and vulnerable groups, both in terms of producers and consumers. Gaining a deeper understanding of the barriers faced by marginalized traditional small-scale farmers may help empower the latter to join BCs, and perhaps other distribution channels associated with AFNs. As for consumers, while the evidence suggests that less affluent customers are also involved in BCs compared to other forms of Hungarian AFN, the involvement of people with very low socioeconomic status appears less likely. This issue raises concerns about food democracy, although broadening the consumer (and producer) base would ensure scaling up. The related trends, opportunities and challenges call for further research.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Ethical Committee of the Centre for Economic and Regional Studies (CERS), Hungary. Written informed consent for participation was not required for this study in accordance with

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the national legislation and the institutional requirements. Written informed consent was not obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Funding

ZB was supported by the Hungarian National Research, Development and Innovation Fund (grant nos. 143247 and 135387).

Acknowledgments

The opinions and data provided by interviewees and representatives of buying clubs are greatly appreciated. Thanks to Gusztáv Nemes, Éva Orbán, Ambrus Michels, Zsófia Smid, Borbála Hernádi, and Eszter Makó for their help with data collection. The language-related contribution of Simon Milton is gratefully acknowledged.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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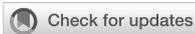
Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsufs.2023.1124877/full#supplementary-material>

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OPEN ACCESS

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RECEIVED 03 January 2023

ACCEPTED 25 April 2023

PUBLISHED 16 May 2023

CITATION

Egli L, Rüschoff J and Priess J (2023) A systematic review of the ecological, social and economic sustainability effects of community-supported agriculture. *Front. Sustain. Food Syst.* 7:1136866. doi: 10.3389/fsufs.2023.1136866

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A systematic review of the ecological, social and economic sustainability effects of community-supported agriculture

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Introduction: Community-supported agriculture (CSA) offers a high potential to provide synergies between ecological, economic and social sustainability aspects. While CSA is still in a niche, it has experienced rapid growth and increasing interest during the last years. An overview of sustainability impacts of CSA based on quantitative empirical work is missing, which is needed for well-informed and targeted policies and funding, as well as to tackle research gaps.

Methods: Here we reviewed the literature to systematically assess empirical and quantitative findings regarding sustainability outcomes of CSA at different levels.

Results: We found that < 30% of the 39 studies included assessed ecological sustainability aspects. If CSA farms were compared to reference systems, they mostly performed better with regard to resource use efficiency and greenhouse gas emissions. The majority of studies evaluated social aspects. While many studies showed that CSA yet fails to reach low-income households, and therefore members do not represent the average population, CSA membership improves health and sustainability behavior. Economic variables were assessed in more than half of the considered studies, but knowledge on the relative performance remains scarce. Nevertheless, first studies indicate high economic viability.

Discussion: Our review suggests a largely positive performance of CSA with regard to sustainability. Accordingly, if CSA would reach a bigger share in the food system, it could contribute to a transformation toward sustainable food systems. To address important knowledge gaps, we recommend the consideration of more and particularly ecological sustainability aspects, comparisons across different farming and marketing systems and the integration of knowledge from different sources such as theses and practical knowledge documented in various languages in different parts of the world.

KEYWORDS

alternative food systems, community-based farming, food system transformation, local food systems, resilience, solidarity

1. Introduction

In the light of climate change, biodiversity loss, increasing demand for agricultural products, social inequalities, and economic pressures, a transformation toward sustainable, resilient and inclusive food systems is urgently needed (Pigford et al., 2018). Alternative food systems, including farmers' markets and shops, community-supported agriculture, food cooperatives and organic agriculture, are increasingly recognized as promising approaches to

address these challenges (Renting et al., 2003; Ilbery and Maye, 2005; Forssell and Lankoski, 2015).

In particular, community-supported agriculture (CSA) offers opportunities to provide synergies between ecological, economic and social aspects that could contribute to a transformation toward sustainable food systems (Nost, 2014; Bloemmen et al., 2015; Schmutz et al., 2018; Haack et al., 2020). Linking farmers and consumers (members) through long-term partnerships including upfront payments to cover production costs is a core principle of CSA (Lamb, 1994; Cone and Myhre, 2000; Volz et al., 2016). Thus, both risks and the harvest are shared. CSA differs from other cooperative approaches, for example community gardens, where gardening is mainly carried by unpaid and nonprofessional volunteers, or food cooperatives, where risks are not shared by producers and consumers and products are not necessarily obtained from primary producers (Haack et al., 2020). CSA farms are highly heterogeneous for example regarding size, products, member involvement and legal forms (Volz et al., 2016). In its simplest form, CSA is a contractual agreement between a farm and a group of members (Cone and Myhre, 2000), but also models exist where both farmers and consumers are organized in one legal entity (Strüber et al., 2023). Likewise, underlying motives include securing livelihoods of farms, spiritual-communal practices (e.g., connection to nature, emphasis on community) or a political tool for sociopolitical change by opposing the capitalistic system through decommodification of food (Blätzel-Mink et al., 2017; Paech et al., 2020). Environmentally friendly farming practices however, are a main principle of most CSA farms (Volz et al., 2016; Cristiano et al., 2020; Netzwerk Solidarische Landwirtschaft e.V., 2022b). Accordingly, reducing synthetic inputs, closing nutrient cycles, improving soil properties and biodiversity are inherent goals of many CSAs (Haack et al., 2020; Cristiano, 2021). Regarding social aspects, many CSA aim at fair wages, transparency, knowledge exchange and participation (Schmutz et al., 2018; Diekmann et al., 2020). Economic security is fostered through holding members and guaranteed sales (Matzembacher and Meira, 2019; Paech et al., 2020).

During the past years, CSA has gained increasing attention and the number of CSA farms has grown in many world regions. In the United States over 12,000 CSA farms existed in 2017 (Woods et al., 2017; Samoggia et al., 2019). The first CSA in Europe was founded in 1978 in Switzerland, yet currently most European CSAs are located in France (>2,000) (Volz et al., 2016; Egartner et al., 2020). In Germany, only five CSA were founded between 1988 and 2010, but more than 400 farms are registered today (Diekmann, 2020; Netzwerk Solidarische Landwirtschaft e.V., 2022a). In China, the first CSA farm has been only founded in 2009, yet already 254 existed in 2016 (Tang et al., 2019). In Japan however, the interest in CSA has recently declined (Gugerell et al., 2021). Compared to the total number of farms [e.g., more than two millions in the US in 2017; (USDA National Agricultural Statistics Service, 2023)], CSA only provides a small proportion of total food production so far. Nevertheless, CSA is increasingly recognized in policy, civil society and academia, also during the COVID pandemic due to increased interest in regional food supply (Stephens et al., 2020; Enthoven and van den Broeck, 2021). In Germany, for example, it has been mentioned as a best-practice model with a catalytic impact

in government documents and commissions (CDU et al., 2018; Zukunftskommission Landwirtschaft, 2021).

Despite the growing interest, to our knowledge, an overview of sustainability impacts of CSA is missing, which is essential, given the sustainability promises of CSA. In this study we provide a synthesis of ecological, social and economic sustainability outcomes based on quantitative empirical work in English and peer-reviewed literature. For this purpose, we (i) developed an analytical framework to assess sustainability outcomes of CSA at the farm level in a transdisciplinary process and (ii) reviewed the literature to systematically assess empirical and quantitative findings related to the different levels of the framework. On the one hand, this is an important baseline for well-informed and targeted policies and funding. On the other hand, this work will highlight relevant research gaps, given that research on CSA is still in an early stage (Cristiano, 2021).

2. Materials and methods

Within a transdisciplinary research project, we developed an analytical framework for a comprehensive assessment of sustainability impacts of community-supported agriculture at the farm level. This framework consists of dimensions, categories, sub-categories and key performance indicators. We then conducted a literature review to systematically assess empirical and quantitative findings related to the different levels of the framework.

2.1. Analytical framework

At the beginning of the transdisciplinary project “InnoLand-Sachsen”, we developed an analytical framework to assess sustainability outcomes of community-supported agriculture at the farm level. In a first step, we developed a hierarchical indicator topology following Carmen et al. (2020). Therefore, we adapted a German tool to assess different sustainability benefits of farms for the society and the environment (Regionalwert Leistungen GmbH). At the highest level we also included three dimensions (ecology, social and economy), but used economy instead of regional economy to be more generic (Table 1). Regarding the ecological dimension, we distinguished the categories soil, biodiversity, inputs and outputs. We referred to in- and outputs instead of “water and climate” to further emphasize the management perspective, as well as desired (e.g., harvest) and undesired outputs (e.g., greenhouse gas emissions). We neglected “animal welfare” as animal husbandry is less relevant in many CSA farms including the ones involved in the project. Regarding the social dimension, we combined the original aspects “expertise” and “employment and work” to the category *team* to cover all aspects related to the employees of a farm. We divided societal effects into farm level aspects and surroundings, as well as members, which are specific for CSA. Here, we also integrated aspects from an existing indicator set to describe social and economic stability of CSA (Strüber et al., 2023). Regarding economy, we specified economic sovereignty in five categories (farm, costs, revenues, financial resources, operating area) to assess economic performance in more detail, also including CSA-specific aspects (Strüber et al., 2023). Finally, we removed the

TABLE 1 Analytical framework including the sustainability dimensions, categories and sub categories.

Dimension	Category	Sub category
Ecology: focus on biotic environment, but also including abiotic factors and farming activities with environmental impacts (Lebacqz et al., 2013)	Soil	Fertility; erosion; density; climate
	Inputs	Water; vehicles/machinery; electricity; pesticides; fertilizer; seeds; seedlings; material/technology; energy
	Outputs	Climate; production; environmental impact; energy
	Biodiversity	Crop diversity; plant diversity; livestock diversity; animal diversity; land use
Social: farm community and society affected by farm activities (Lebacqz et al., 2013; Terrier et al., 2013)	Team	Knowledge/learning; trust; diversity/inclusion; fluctuation; income satisfaction; full time/part time; buffer capacity
	Members	Knowledge/learning; trust; diversity/inclusion; fluctuation; satisfaction; engagement; identification; distance; supply; behavior; well-being/health
	Farm	Transparency; attractivity; goals/visions/strategies; bidding; community building
	Surroundings	Cooperation; competition; rejection/recognition; knowledge
Economy: economic viability of a farm (Latruffe et al., 2016), as well as general economic characteristics of the farm	Farm	Products; management; age; distribution; marketing channels
	Costs	Labor; running costs; investments
	Revenues	Membership fees; donations; subsidies; projects
	Financial resources	Liquidity; equity ratio; balance; diversification; contract duration
	Operating area	Yard; operating area; farm size
	Range	Shares; access; innovation; productivity

original aspects “regional networks” and “regional economic flows,” as they were partly covered in the social category *surroundings* and because regionalization was not a specific focus of our project. For each category we selected sub categories based on existing catalogs and literature (INL, XXXX; *Regionalwert Leistungen GmbH*; Sanders and Heß, 2019; Haack et al., 2020; Strüber et al., 2023). We further added the sub categories *buffer capacity* and *rejection/recognition*, as we experienced these aspects as important from our previous work with CSA farms (Voge et al.)¹. For each sub category, we then proposed indicators to describe them. In a next step, we presented the initial framework to a group of seven CSA experts. The CSA experts consisted of five employees (four farmers and one coordinator) of three CSA farms in Saxony, Germany, a researcher from a project focusing on the transformative potential of CSA and an employee from a regional association strengthening direct marketing. During five workshops of around two hours each between October 2021 and March 2022, experts could first modify existing or propose additional indicators. Second the experts rated relevance and feasibility from 1 (not relevant/feasible) to 5 (highly relevant/feasible) (Carmen et al., 2020). Based on this assessment we selected a final set of indicators that were subsequently measured in the three CSA farms involved (where both evaluation criteria reached a score of 3 or higher on average). The analytical framework and its underlying

indicators are merely descriptive. To evaluate actual sustainability outcomes, the observed indicator values need to be linked to specific sustainability objectives (Latruffe et al., 2016).

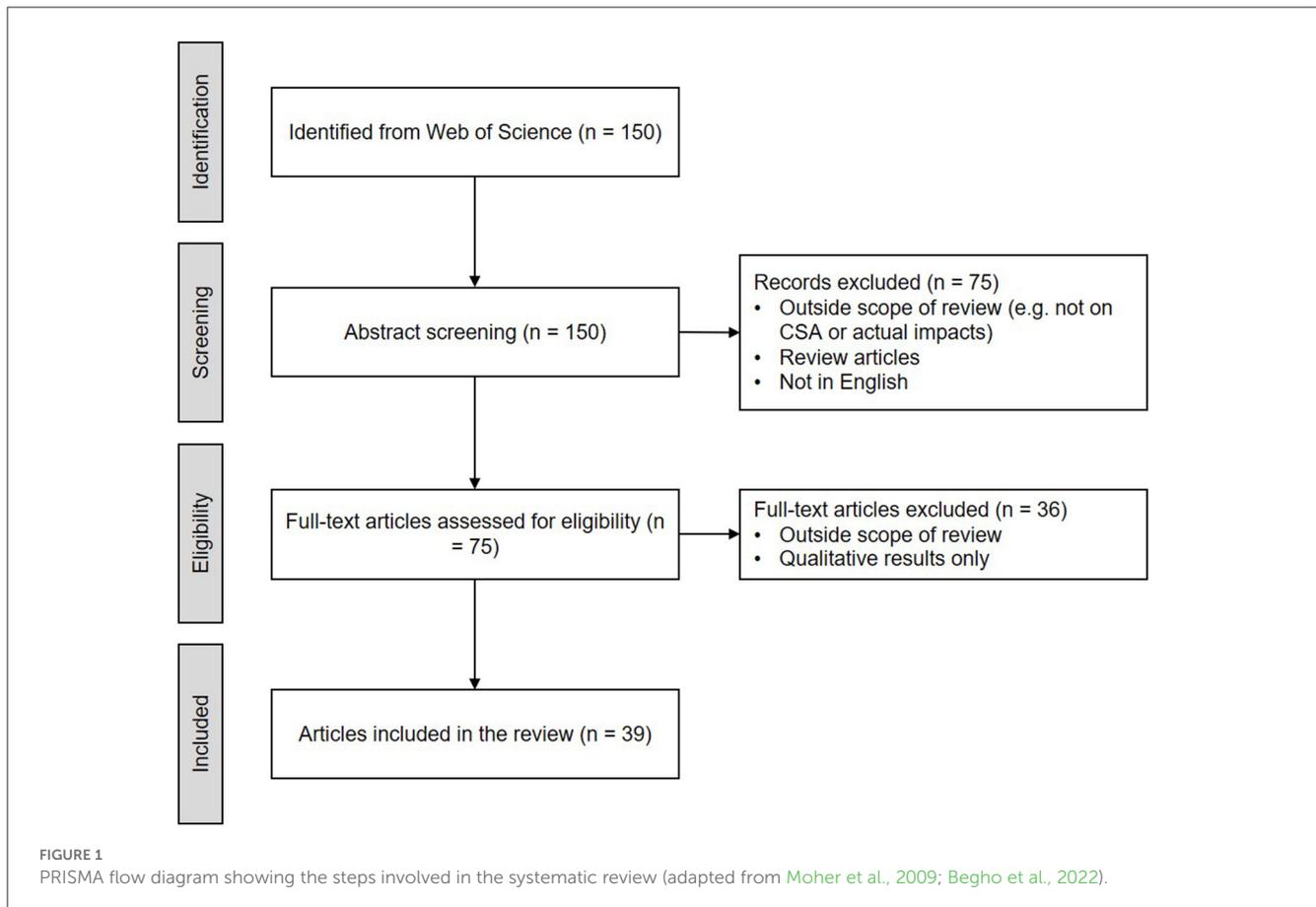
2.2. Literature review

We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) to guide the selection of literature (Moher et al., 2009). We sourced literature from Web of Science using the following search term considering all fields: (“shared agriculture” OR “community supported agriculture” OR “community based agriculture”) AND (“sustainable” OR “sustainability”). We restricted our search to the years 1945 to 2021 and updated the search August 15 2022.

We only included articles that (i) assessed sustainability-related outcomes of community-supported agriculture at the farm level, (ii) related to our analytical framework, (iii) agriculture, (iv) included empirical, (v) quantitative findings, and (vi) were written in English. For example, we excluded qualitative findings on the motivation or drivers of farmers and members to establish or join a CSA or investigations of non-members. Due to the limited number of articles within our scope, we did not apply any criteria regarding underlying statistics (e.g., regarding significance or sample size).

Regarding the included articles, we extracted all quantitative results that could be associated to the sub categories of our analytical framework, i.e., that used indicators describing these sub categories. We remained on the sub category level to achieve a higher consistency between our framework and the literature

¹ Voge, J., Newiger-Dous, T., Ehrlich, E., Ermann, U., Ernst, D., Haase, D., et al. (in review). Food for the plate and not for the waste - assessing yields, food loss and waste in community-supported agriculture in the region of Leipzig, Germany. *Int. J. Agric. Sustain.*



included (e.g., when different indicators were used to describe the same sub category).

For each investigated variable, we extracted the country, number of CSA farms and members included, and the effect (positive, neutral, negative, unclear) if the outcome at the CSA was related to a reference system (conventional farm, average population, farm statistics etc.) or time period (e.g., time before joining a CSA) and could be clearly linked to a sustainability objective (Latruffe et al., 2016). The number of underlying CSA farms was not documented in four studies. Here we estimated the number of investigated CSA farms by dividing the members included by the average number of members included per CSA investigated in all other studies.

Regarding effects, a positive effect would indicate that the CSA farms achieved higher sustainability values for a given variable, for example if the investigated CSA farms produced less greenhouse gas emissions. Regarding diversity of CSA members, we rated an effect as positive, if they represented the average population, e.g., with regard to ethnicity, income or education. If values were similar to a reference system, the differences were insignificant if applicable or if CSA performed better than one reference system but worse than another, we classified the effect as “neutral.” We classified an effect as “unclear,” if it was ambiguous whether an observed difference between the CSA and a reference is desirable from a sustainability perspective, e.g., regarding farm size and age, or if the results were not compared to a reference. Based on this assessment we aggregated the number or proportion of variables showing positive, neutral, negative and unclear effects per dimension or

sub-category. We used the statistical software package R 4.1.3 (R Core Team, 2022) run via RStudio (RStudio Team, 2022) for data analysis.

3. Results

3.1. Literature overview

Our literature search yielded 150 records, of which 75 were excluded after we screened the abstract and 36 after we assessed the full article, hence we included 39 articles in the review (Figure 1; Supplementary Tables 1, 2). The reviewed studies included more than 2,500 CSA farms (Table 2). The large majority of studies were implemented in the United States (26), where over 2,000 CSA farms were investigated. All other studies focused on European countries (nine), except for one study each in Brazil, China, and Japan. More than 85% of the studies were published after 2010, while the first study was published in 2000 (Supplementary Table 2). Major research areas included agriculture (14), environmental sciences and ecology (11), science and technology—other topics (11), and sociology (six; Supplementary Table 3).

3.2. Sustainability dimensions

In almost all CSA farms considered, social variables were investigated (Figure 2). Economic and ecological variables were

TABLE 2 Number of investigated CSA farms and underlying studies per country ($n = 39$).

Country	CSA farms	Studies
US	2,368	26
Spain	57	2
Multiple	41	2
Italy	20	2
United Kingdom	8	2
China	7	1
Romania	3	1
Turkey	3	1
Brazil	2	1
Sweden	1	1

One study investigated CSAs in two different countries (US, Hungary) and one in three different countries (Austria, Norway, Japan).

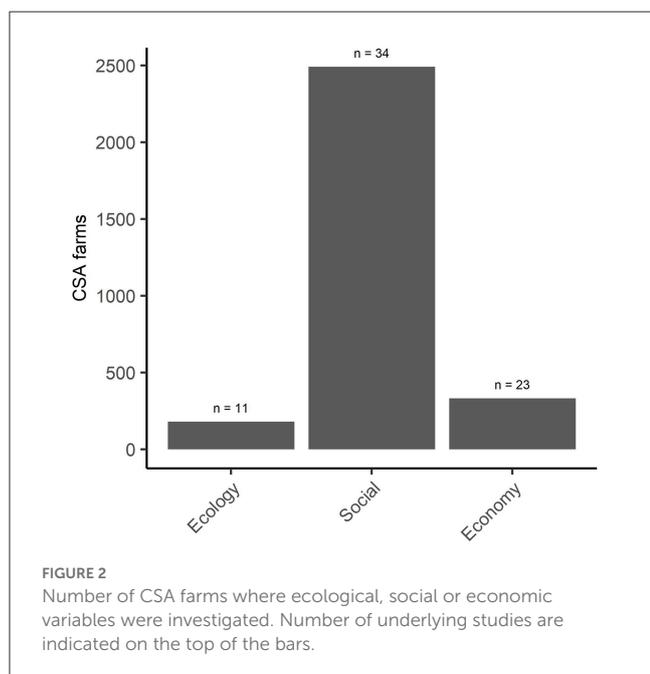


FIGURE 2 Number of CSA farms where ecological, social or economic variables were investigated. Number of underlying studies are indicated on the top of the bars.

investigated in around 13 and 7% of the farms, respectively. In 169 farms, structural variables were examined including management practices (with or without organic certification), organizational and legal form, which is about 7% of the farms considered.

3.3. Sustainability effects

Effects were unclear in 46% of the investigated variables, mainly because CSA farms were not compared to any reference, for example to a different farming system or the average population. Regarding ecological variables, CSA farms performed better than the reference systems in 44% of the cases (Figure 3). Negative effects were only identified in 6%. Regarding social variables, effects were more ambiguous. Positive effects were found in 25%

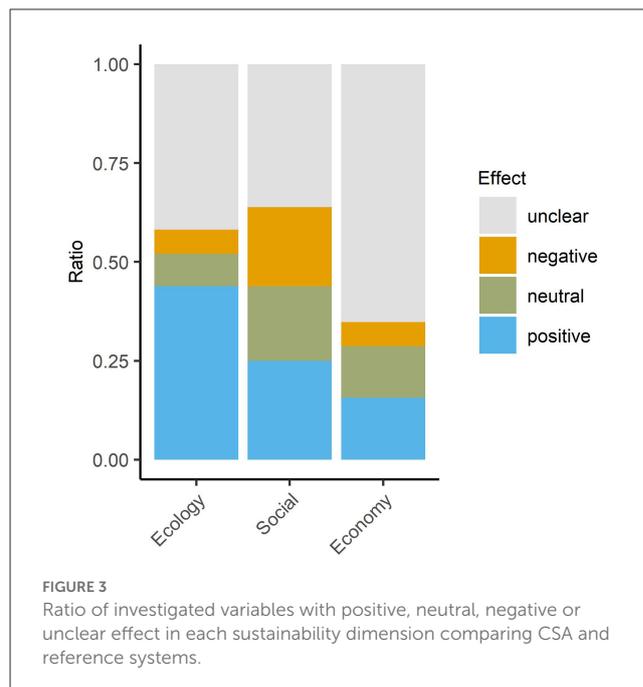


FIGURE 3 Ratio of investigated variables with positive, neutral, negative or unclear effect in each sustainability dimension comparing CSA and reference systems.

of the comparisons, neutral and negative effects in 19 and 20%, respectively (Figure 3). In economy, no comparisons were made for more than 60% of the variables investigated. Negative effects were found in 6%, compared to 17% with positive effects (Figure 3).

3.3.1. Ecological sustainability

Ecological variables covered inputs, outputs and biodiversity, while soil variables were never considered (Table 3; Supplementary Table 4). Regarding inputs, most studies found that CSA farms used less fertilizer, vehicles and machinery, pesticides and energy compared to reference systems. Organic substances were typically used in higher amounts. For example, one CSA farm in Spain used more organic pesticides compared to two conventional farms, yet their energy consumption was around 10 times lower compared to the energy consumption for pesticides used in the conventional farms (Pérez-Neira and Grollmus-Venegas, 2018). In a comprehensive life-cycle assessment, Pérez-Neira and Grollmus-Venegas (2018) showed that the investigated CSA performed much better for most ecological variables compared to two conventional farms. In particular, non-renewable energy demand was substantially lower both per ha cultivated and per kg of produce. Regarding climate emissions, only positive, neutral or unclear effects were found. For example, the global warming potential of seven CSA farms investigated in China was on average 61 and 39% lower compared to eight conventional and organic farms, respectively (Zhen et al., 2020). According to a study including four CSA farms in the UK, CSA could contribute to a 28% reduction of greenhouse gas emissions from dietary intake (Mills et al., 2021). Agricultural production was reported in three studies, yet not compared to any reference system (Table 3). This also applied for crop and livestock diversity. On average, 64 CSA farms investigated in the United States cultivated more than 44 crops (Galt et al., 2012; Paul, 2019).

TABLE 3 Number of variables with positive, neutral, negative or unclear effects in each sub category.

Dimension	Category	Sub category	Positive	Neutral	Negative	Unclear	CSA farms	Studies
Ecology	Inputs	Water	1	1	0	1	8	2
Ecology	Inputs	Vehicles/machinery	5	1	2	11	112	8
Ecology	Inputs	Electricity	0	1	0	2	7	3
Ecology	Inputs	Pesticides	5	0	1	1	9	3
Ecology	Inputs	Fertilizer	14	0	3	2	57	4
Ecology	Inputs	Energy	7	0	0	2	57	4
Ecology	Outputs	Climate	4	1	0	9	17	4
Ecology	Outputs	Production	0	0	0	3	25	3
Ecology	Outputs	Environmental impact	1	0	0	0	7	1
Ecology	Biodiversity	Crop diversity	0	0	0	2	64	2
Ecology	Biodiversity	Livestock diversity	0	0	0	1	48	1
Social	Team	Knowledge/learning	1	0	1	2	68	5
Social	Team	Diversity/inclusion	0	0	1	8	83	2
Social	Team	Income	4	2	0	2	2110	5
Social	Team	Satisfaction	4	0	0	1	23	3
Social	Team	Full time/part time	0	0	0	4	59	4
Social	Members	Knowledge/learning	4	2	0	0	8	3
Social	Members	Diversity/inclusion	0	16	48	38	166	21
Social	Members	Fluctuation	0	0	0	10	187	8
Social	Members	Satisfaction	0	0	0	2	13	2
Social	Members	Engagement	3	1	0	6	30	7
Social	Members	Identification	1	1	0	1	16	3
Social	Members	Distance	0	0	0	1	5	1
Social	Members	Supply	1	0	0	3	13	4
Social	Members	Behavior	39	21	0	8	33	11
Social	Members	Well-being/health	7	6	1	0	6	2
Social	Farm	Transparency	0	0	0	1	19	1
Social	Farm	Goals/visions/strategies	0	0	0	1	19	1
Social	Farm	Community building	1	0	1	1	10	3
Social	Surroundings	Cooperation	0	0	0	1	56	1
Social	Surroundings	Knowledge	0	0	0	4	56	1
Economy	Farm	Products	0	0	0	2	43	2
Economy	Farm	Management	3	0	0	1	20	2
Economy	Farm	Age	0	0	0	9	174	9
Economy	Farm	Distribution	0	0	0	3	48	3
Economy	Farm	Marketing channels	2	1	0	1	46	3
Economy	Costs	Running costs	1	9	3	19	33	5
Economy	Costs	Investments	0	2	0	0	7	1
Economy	Revenues	Membership fees	1	0	1	9	152	10
Economy	Revenues	Donations	0	0	0	1	19	1
Economy	Financial resources	Liquidity	0	1	0	1	37	2

(Continued)

TABLE 3 (Continued)

Dimension	Category	Sub category	Positive	Neutral	Negative	Unclear	CSA farms	Studies
Economy	Financial resources	Balance	8	2	1	1	97	7
Economy	Operating area	Operating area	0	0	0	11	166	10
Economy	Range	Shares	0	0	0	14	191	12
Economy	Range	Access	1	0	0	0	16	1
Economy	Range	Productivity	2	0	2	2	26	4

Only variables with at least 5 underlying CSA farms are shown.

3.3.2. Social sustainability

Most social variables covered team (i.e., employees) and member aspects (Table 3; Supplementary Table 4). Variables related to the entire farm or the surroundings were only addressed in a few studies. Regarding CSA farmers, positive effects were found for satisfaction and income. For example, Hunter et al. (2022) found that happiness and positive future beliefs were higher in CSA farms compared to other alternative food networks. Farmers in Romania stated that they are more satisfied and respected since being a CSA farmer (Moellers and Birhală, 2014). In the US, the gender pay gap in CSA farms was around one third lower compared to the average (Fremstad and Paul, 2020), less partners needed to work off-farm compared to organic farming (Galt et al., 2012) and earnings were more than 350% higher than on average, yet still not enough to secure living (Paul, 2019). In a CSA in Spain, income was up to around 50 and 75% higher than income from investigated conventional farms (Pérez-Neira and Grollmus-Venegas, 2018).

Investigated CSA members were generally not representing the average population. They were typically white, well-educated and with higher income than the average population (Table 3). Moreover, women were typically overrepresented. In contrast, effects on members' behavior and well-being and health were largely positive or neutral (Table 3). For example, various studies found that CSA members more often prepared food at home, ate less processed food and more vegetables and fruits (MacMillan Uribe et al., 2012; Wilkins et al., 2015; Allen et al., 2017; Rossi et al., 2017; Vassalos et al., 2017). CSA membership was further related to sustainability behaviors such as recycling (MacMillan Uribe et al., 2012; Vassalos et al., 2017). However, no significant positive effect was found regarding the reduction of food waste (Russell and Zepeda, 2008). Among others, health benefits included lower expenditures at the pharmacy and higher self-evaluated health since joining CSA (Allen et al., 2017; Rossi et al., 2017). Mostly positive effects were achieved regarding knowledge transfer and learning, for example, related to cooking expertise and nutritional awareness (Rossi et al., 2017). Regarding engagement, CSA membership was associated with higher volunteerism (Obach and Tobin, 2014; Carolan, 2017) and higher participation in political events (Carolan, 2017).

3.3.3. Economic sustainability

Economic variables encompassed all categories (farm, costs, revenues, financial resources, operating areas, range), yet actual effects were largely unclear (Table 3; Supplementary Table 4). Only regarding the financial balance, several studies found a positive

effect. Zhen et al. (2020) showed that average profit per hectare was nearly three times higher in CSA compared to conventional farms. The gross benefit in a CSA in Spain was nearly 17 times higher than the costs (Pérez-Neira and Grollmus-Venegas, 2018). One study in Sweden indicated that farm management is more efficient compared to other types of alternative food networks (Hunter et al., 2022). In contrast, running costs were found to be higher regarding delivery and labor (Zhen et al., 2020), as well as marketing (Hardesty and Leff, 2010). Regarding economic productivity, the number of positive and negative effects was equal. Studies in Romania (Moellers and Birhală, 2014) and Spain (Pérez-Neira and Grollmus-Venegas, 2018) found that more labor is needed compared to other farms. However, profit and sales per labor hour were substantially higher compared to other direct marketing approaches in 21 CSA farms in the United States (Jablonski et al., 2019).

4. Discussion

We found that <30% of the quantitative studies included investigated ecological aspects and in around 40% of these studies relative effects compared to other farming systems were either unclear or not investigated, thus a reliable evaluation of the ecologic sustainability of CSA is not yet possible (Christensen et al., 2018; Wellner, 2018). Nevertheless, existing studies show a clear positive trend. In particular, regarding resource use efficiency and greenhouse gas emissions, investigated CSAs mostly performed better than conventional systems. Research on crop yields, crop and livestock diversity, and soil health remains incomplete or is not yet performed. Environmental effects have been investigated widely and more often than social and economic aspects for agri-food systems generally, but also with regard to organic agriculture and local food systems (Mundler and Laughrea, 2016; El Bilali et al., 2021). To which extent these findings are transferrable to the CSA context needs to be evaluated. With regard to slowly changing processes in complex ecosystems such as soil, changes in soil functions as response to altered management practices might be only detectable after decades (Nortcliff, 2002; Bai et al., 2018; Bünemann et al., 2018). In this case, the use of proxies and systemic modeling approaches combined with field data might be essential to evaluate altered management practices long-term sustainability (Bünemann et al., 2018; Rabot et al., 2018; Vogel et al., 2018).

Nearly 90% of the quantitative studies included addressed social sustainability aspects. Given that CSA is a social innovation

centered around a community of producers and consumers, their relationship, solidarity, cooperation, trust, engagement and participation, this is hardly surprising (Jarosz, 2000). Moreover, in contrast to many ecological variables that require continuous and long-term effort for data collection, a wide range of social aspects can be captured with one-time (online) surveys or interviews. However, the majority of studies within the social dimension assessed socio-economic variables of CSA members including gender, age, income, ethnicity and education. Accordingly, CSA members do not represent the average population, for example with regard to low income households (Galt et al., 2017). Besides various internal mechanisms to offset costs, e.g., membership fees related to income or anonymous bidding rounds, externally subsidized memberships could improve access to CSA and related health benefits (Izumi et al., 2018). Apart from the limited diversity of CSA members, most studies found positive social effects, particularly with regard to health and sustainability behavior, for example, including dietary changes, which can substantially reduce environmental impacts of food systems (Willett et al., 2019).

More than half of the studies included covered economic aspects. However, knowledge on actual economic performance compared to other systems is still very limited. Nevertheless, first studies indicate high economic viability of CSA farms. If this pattern is generalizable, CSA could provide a suitable alternative to farm growth or termination in the light of economic competition in the agricultural sector (Paech et al., 2019). In this context, diffusion of CSA is another emerging topic in the CSA literature screened here. Amongst others, diffusion relies on institutional support, access to affordable land and sufficient demand (Doernberg et al., 2016; Pisarn et al., 2020; Zoll et al., 2021). For example, Diekmann and Theuvsen (2019a) found that 27% of non-participants would be interested in CSA membership in Germany, i.e., much more than the proportion of the German population currently organized in a CSA, which is <1% (own estimation based on Netzwerk Solidarische Landwirtschaft e.V., 2022a). However, members need to be held, e.g., by increasing crop diversity and cooperation among different CSA farms (Galt et al., 2019). In this context, understanding and fostering the values and preferences of CSA members is crucial to establish long term relationships (Chen, 2013a,b; Diekmann and Theuvsen, 2019b). Reducing fluctuation is particularly relevant in the context of current inflation rates, which will also provide insights on the economic resilience of CSA.

Besides the observed bias in current CSA literature toward social variables, we also observed a clear geographical imbalance. While most studies analyzed in this paper focused on the US, the country with the largest number of CSA farms, no study investigated French CSA farms, where the vast majority of European CSA farms are located (Samoggia et al., 2019; Egartner et al., 2020), yet this might also be related to our search strategy (see below). Moreover, besides Brazil, China and Turkey no countries from the Global South or emerging economies were considered. In the light of contrasting socio-economic conditions, knowledge from different types of countries is crucial. To obtain an overview of the current status of CSA, the international CSA network Urgenci (urgenci.net) is launching a global census in 2023, which will provide an important baseline for future research.

Many of the studies considered only cover a limited number of CSA farms, focus on few sustainability aspects and often remain descriptive.

While our study offers an important overview of sustainability-related effects of CSA, it faces two major limitations. First, we only included English articles indexed in Web of Science, which leads to a bias toward articles published in US journals and particularly neglects research from the Global South (Gibbs, 1995; Lund, 2022). Given that CSA research is often geographically limited and closely related to practice, many studies are likely to be published in other languages. This could also explain, why despite the large number of CSAs, no study from France was included. In Germany (and probably also elsewhere), the number of theses on CSA is rapidly increasing. While most of them are in German and not published in scientific journals, many of them offer valuable insights that should be considered, if certain quality criteria are fulfilled. While CSA is the most common term in international literature, including country-specific terms, for example AMAP (Association pour le Maintien d'une Agriculture Paysanne) in France and teikei in Japan could increase the literature base and the geographic scope. Second, we only included quantitative findings related to our framework and without applying any criteria regarding the statistics of the selected paper. In particular regarding social aspects, qualitative studies offer additional valuable insights, for example related to underlying values, identity and social practices (Diekmann and Theuvsen, 2019b; Neulinger et al., 2020; Zoll et al., 2021). Consequently, our literature review is only a first step and more literature need to be included to draw broader conclusions on existing findings of the sustainability of CSA.

Based on our review we suggest that more studies investigating actual sustainability effects of CSA farms following standardized protocols are needed, in particular including comparisons across different farming systems and with regard to their ecological effects. As empirical work in this context might require high efforts, proxies and findings related to organic farming could be considered. More research is essential for CSA stabilization, development and scaling, as well as the development of policies to support CSA. This also includes approaches to reduce the fluctuation of CSA members, to increase their diversity and to understand and utilize future consumer potentials. Moreover, existing knowledge should be better integrated and publicly accessible. The German CSA network for example, collects bibliographic information on existing theses. Ideally, the central findings of such research would be integrated into one structured and international database to simplify access and knowledge transfer. Finally, more funding is needed to support these efforts. In the light of the high sustainability promises of CSA shown so far and the urgent need to transform food systems toward sustainability, such funding would be well placed to support this goal. Therefore, obstacles for CSA to gain access to existing programs and funds (e.g. common agricultural policy in the EU) could be reduced and new programs could be established.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Author contributions

JR identified the relevant studies for the review. LE performed the analyses and wrote the paper in collaboration with JR and JP. All authors designed the study and revised multiple versions of the manuscript.

Funding

This research is part of the project InnoLand-Sachsen (Innovative Modelle für eine nachhaltige und regionale Wertschöpfung: Synergien und Potenziale der Solidarischen Landwirtschaft in Sachsen. This measure is co-financed with tax funds on the basis of the budget passed by the Saxon State Parliament (FKZ:100595134).

Acknowledgments

We thank Sabrina Gerdes and Marius Rommel, as well as the three CSA farms involved for their contribution during the development of the analytical framework.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsufs.2023.1136866/full#supplementary-material>

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OPEN ACCESS

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RECEIVED 29 April 2023

ACCEPTED 23 May 2023

PUBLISHED 15 June 2023

CITATION

Stehrenberger A and Schneider T (2023) "At first, I was only a subscriber": re-mediating food citizens' solidarity practices through digital technologies.
Front. Sustain. Food Syst. 7:1214354.
doi: 10.3389/fsufs.2023.1214354

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"At first, I was only a subscriber": re-mediating food citizens' solidarity practices through digital technologies

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In this paper, we explore how digital technologies re-mediate solidarity practices in alternative food networks (AFNs). To do so, the first author conducted an 8-month (auto-)ethnography of a community supported agriculture (CSA) initiative in Switzerland and 12 semi-structured interviews with CSA members. We identified three types of solidarity practices in our analysis that aim to support social inclusiveness, increase responsibility and sustainability, and foster the sharing of risk, work and infrastructure amongst CSA members. Digital technologies are central for joining and becoming a member of the CSA and also play a vital role in sharing information and organizing members' work assignments. By becoming a member, consumers become subscribers voting with their wallet. If they regularly engage in farm work, they become prosumers or co-producers. Thus, our analysis foregrounds the continuum of food citizenship in the CSA we studied. However, the number of subscribers increases through digital technologies, transforming the initiative from an *alternative to the market* to an *alternative within the market*, whereby certain aspects of solidarity, such as social inclusiveness and sharing, are not realized anymore. Our study contributes to the emerging field of digital food studies by showing how solidarity is digitally enabled and negotiated in CSA, and how this shapes food citizenship.

KEYWORDS

alternative food networks, community supported agriculture, food citizenship, subscribers, digital technologies, sustainability, social and solidarity economy

1. Introduction

As the Covid-19 pandemic unfolded globally in 2020, media outlets reported that a growing number of grocery shoppers shifted to local food consumption in the Global North. Community supported agriculture (CSA), including vegetable box subscriptions, registered an influx of new members (see [Nemes et al., 2021](#), p. 594). Farmers markets—those that were still open—and farm shops attracted new shoppers. And organic food stores selling local produce saw a rise in sales. Supermarkets reported an increase in sales of fresh produce, and digital food provisioning platforms saw a jump in the number of new customers. For instance, in March 2020, the Swiss startup and online food marketplace Farmy.ch stated in an interview that their sales doubled

year over year after February 2020.¹ Reasons given in news reports for accessing local and fresh produce varied from concern over the robustness of global food supply chains, which had come under strain in the pandemic, to a desire to purchase healthier foods, or people simply having more time to cook as they worked from home and ate out less.

While digital food provisioning platforms such as meal box schemes, digitalized local food markets and food delivery apps have gained prominence before (Khan and Sowards, 2018; Samsioe and Fuentes, 2020), the pandemic accelerated the growth of these digital food platforms. In these digital times, and especially during Covid-19, shoppers looking for local food commonly turned to the Internet to learn what is available, where and how. While searching, they might discover the supermarkets' online shopping and delivery options, but are also likely to come across dedicated online platforms that specialize in the sale of local foods, such as the above-mentioned example of Farmy.ch. They might also learn about alternative food networks (AFN), such as cooperatives and community supported agricultures, which increasingly have a presence online, including an online shop. What commonly distinguishes AFNs and digital food provisioning platforms is their market orientation. AFNs aim to create and foster *alternatives to markets*. They create "social spaces where vanguard projects of alternative economy" are taking place (Goodman et al., 2012, p. 4), with the ambition to foster spaces of possibilities where members of social movements create solidarity economies. These solidarity economies can take many different forms, from co-operatives and social enterprises to collectives (Goodman et al., 2012; Hitchman, 2019, p. 10). Commercial digital food provisioning platforms' goal, on the contrary, is to establish their platform as a novel middle space between producers and consumers. They aim to provide an alternative to established grocery stores and their supply chains. Thus, these commercial digital food provisioning platforms provide *alternatives within markets*.

These different types of alternatives for accessing and purchasing local produce may appear similar to a novice local food shopper, based on their websites. Shoppers may, in fact, treat them as a bundle of alternatives from which to pick in order to access local foods, despite these organizations' different organizational forms, values and commitments. In this paper we explore how digital technologies affect food citizenship in CSA based on an (auto-)ethnographic study of a Swiss CSA initiative and semi-structured interviews with members of the initiative. We foreground how digital technologies enable a continuum of roles from consumer-citizen to food citizen in our field work. More specifically, these roles range from subscribers to a CSA supporting its existence to people who holistically act as food citizens, participating in food-related solidarity practices beyond the initiative. This allows us to reflect upon how these varying roles enable different ways of doing solidarity in the Swiss CSA we studied, and how digital technologies organize and re-mediate these practices.

The article is organized as follows. First, we introduce CSA as a form of AFN and then review the literature on food citizenship as well as the literature on the digitalization of collective food procurement. Second, we provide an overview of *Solveg*—a pseudonym we chose for

the CSA initiative we studied to ensure the anonymity of the initiative's members. Third, we explain our study design and chosen research methods. Fourth, we present different ways of how solidarity is done in the initiative and discuss how sharing practices that are central for doing solidarity in practice are digitally enabled at *Solveg* and how this affects food citizenship. In conclusion, we explore the implication of our findings for understanding food citizenship in digital times by taking into account existing research on digital food provisioning.

2. Food citizens' solidarity practices and the underexplored role of digital participation in AFNs

2.1. "Food citizenship": from food consumers to food citizens and beyond

Over the last two decades, consumers have been called upon to vote with their wallets in order to express their social or political preferences. A myriad of social movements, non-governmental organizations (NGOs) as well as filmmakers, writers and activists have advanced this agenda of political consumerism, i.e., "market-oriented engagements emerging from societal concerns associated with production and consumption" (Boström et al., 2019). Political consumerism, by now a common form of civic engagement, is conceptualized as an "informal community-based associational activity that does not involve political organizations, parties, or officials, and that is undertaken on a voluntary basis for charitable and social purposes" [De Zúñiga et al., 2014, pp. 491–492, drawing on Putnam's (2000) definition]. Typically, political consumerism entails boycotting (refusing to purchase goods/brands as a way of expressing strong disapproval) or buycotting (purchasing specific products and brands as a way of expressing strong support). Yet, as Stolle and Micheletti (2013) observe, there are two additional forms of action in practices of political consumerism: 'discursive political consumerism' that entails communicative actions and 'lifestyle political consumerism' that typically involves major shifts in a person's lifestyle. Political consumerism, thus, blurs the boundaries between economy and democracy. A separation between individuals' social roles as consumers and citizens becomes increasingly untenable. The term citizen-consumer has been proposed for consumers who exercise their citizenship through political and ethical consumption (Johnston, 2008).

Food features prominently in consumers' everyday practices of political activism (Halkier, 2019). Apart from animal welfare issues and health concerns, sustainability has become a prominent concern of political activists in recent years (Collinson et al., 2023). However, food scholars have pointed out that little is known about food citizenship in practice. For instance, Hatanaka (2020) states, "there is a dearth of research on what it means for a person to act as a food citizen and the kinds of governance processes that enable food citizenship." Her ethnographic research of the Seikatsu Club Consumer Cooperative (SCCC) in Japan over three summer terms contributes to filling this gap. SCCC was founded in 1968 to increase food safety in milk and has since developed into an initiative with 380,000 members who take responsibility for food as co-producers; thus, SCCC has many elements of a CSA, as well as of a procurement cooperative. She shows how consumers and producers act as food

¹ <https://www.blick.ch/wirtschaft/online-boom-wegen-coronavirus-lieferengpaesse-bei-migros-coop-und-co-id15790167.html>

citizens guided by a shared set of values, including inclusivity, meaningful participation, community and collective good, transparency and short supply chains (Hatanaka, 2020, pp. 56–57). Hatanaka finds that by defining sustainability standards, participating in ‘audit by many’ and in sharing risks and responsibilities, members and producers act as food citizens in the SCCC. Based on her long-term ethnography she found that food citizenship fosters commitment, partnership and a shared vision among members and producers, which in turn inspires them to seek continuous improvements in sustainability. Thus, food citizenship “can be an effective means for advancing sustainability in food systems” (Hatanaka, 2020, p. 61).

Anthropologist Cristina Grasseni (2018), who studied solidarity purchase groups² in three European cities, shows that examining collective food procurement will provide important new insights into food citizenship. Attending to collective food procurement, she argues, “might help reframing the issue of European food systems not only from an agricultural and logistic point of view, but also from a social point of view that goes beyond individual preferences and tastes. [...] food procurement in all its facets highlights how food is a mediator of relations within social networks, not only a commodity or nutrient” (Grasseni, 2018, p. 1). CSA is a specific form of collective food procurement and is particularly insightful for understanding how practices of food citizenships can be fostered. Solidarity practices are crucial in activities shaped by food citizens’ holistic understanding of the food system, whether towards nature, animals, or other citizens.

2.2. Solidarity practices in CSAs: the cornerstone of this kind of AFN

AFNs are defined as “social spaces where vanguard projects of the alternative economy” are taking place (Goodman et al., 2012, p. 4). Goodman and colleagues speak of them as spaces of possibilities, where members of social movements are directing markets and thereby creating solidarity economies which can take many different forms, “from co-operatives to social enterprises and collectives” (Goodman et al., 2012; Hitchman, 2019, p. 10). Established forms of AFNs are farmers markets, community gardens, solidarity purchase groups or CSAs. The latter was, as already indicated, the object of our investigation. A CSA is composed of a “community of individuals who pledge support to a farm operation so that the farmland becomes, either legally or spiritually, the community’s farm, with the growers and consumers providing mutual support and sharing the risks and benefits of food production” (USDA in Robinson and Farmer, 2017). Moreover, consumers become growers themselves, as in most CSAs consumers are supporting the initiative with their own work force. This blurring and redistribution of roles is discussed under the notion of *prosuming*, whereby the established roles of consumers and producers are becoming fused and democratized (Boddenberg, 2018, p. 134).

In these new co-production processes, members follow the *food-as-means* approach described by Dal Gobbo and colleagues, with the aim of strengthening social aspects, as is the case for CSA initiatives

(2021, p. 9). CSAs can provide fresh local foods to communities that may not otherwise have access to them (Kolodinsky and Pelch, 1997; Van En et al., 1997; Schmidt et al., 2011). These communities can consist of people living in food deserts or in urban areas without access to their own land. CSA initiatives envision developing personal and social relationships based on the notion of sharing. Practices of sharing include sharing cost, risk, planning, work, harvest and celebration within the dimensions of food security, sustainable agriculture and community building (Fieldhouse, 1996; DeLind, 1999). This view is contrasted with the approach of *food-as-end*, whereby the optimization of transactions is targeted (Dal Gobbo et al., 2021, p. 9).

The cornerstone of solidarity within CSAs can be derived from the term community in community supported agriculture, also called community based/shared agriculture (Fieldhouse, 1996; Macias, 2008) or sustainable community agriculture (Forno and Graziano, 2014). Factors that positively influence a strong community and create new social spaces are shared values, emotions, trust, understanding, engagement and solidarity support (Jarosz, 2000; Poulsen, 2017; Breidahl et al., 2018). In German solidarity is even anchored in the name for CSA, “solidarische Landwirtschaft,” which can be translated as “solidary agriculture.” Other aspects of CSA closely intertwined with solidarity are social equality and a broad community participation, whereby, for instance, the integration of deprived persons is sought (Hinrichs and Kremer, 2002; Goodman, 2004; Lamine, 2005; Peterson et al., 2015; Diekmann and Theuvsen, 2019). Although such initiatives claim that the concept is open to everyone, according to Hinrichs and Kremer (2002) there are four criteria that determine access: education, the social network, race, and income.

Solidarity was defined by Prainsack and Buyx (2012) as “shared practices reflecting a collective commitment to carry ‘costs’ (financial, social, emotional, or otherwise)” (2012, p. 346). The term solidarity can thereby either be understood on an individual or a structural level (Berger, 2004, p. 254). The first term captures solidarity practices and understandings of individuals, while the latter looks at how solidarity is embedded and lived in institutionalized structures (Tranow, 2012, p. 35). Acknowledging the difficulties of solidarity within society, AFNs aim to foster new social values (Forno and Graziano, 2014, p. 1). These values and the wider concept of solidarity in connection to AFNs are addressed in the literature highlighting different aspects or related concepts of solidarity, such as social sustainability (Diekmann and Theuvsen, 2019), community (Macias, 2008; Pole and Gray, 2013), urban commons (Borčić, 2020), co-production (Grasseni, 2014), convivialism (Khushf, 1998; Boddenberg, 2018), sharing (Fieldhouse, 1995; Michelini et al., 2017) or solidarity economy (Grasseni, 2014; Hitchman, 2019).

Research has shown, however, that in practice, from both the consumers’ and producers’ side, individual motives can trump collective ambitions. Consumers’ motives to join include obtaining a harvest share of fresh organic local produce (rather than social reasons such as community involvement), connection to the farm, meeting like-minded people, participating in farm activities or even sharing risks (Fieldhouse, 1996; Conner, 2003; Oberholzer, 2004; Ostrom, 2007; Lang, 2010; Pole and Gray, 2013; Diekmann and Theuvsen, 2019). Researchers explored whether members join driven by ideology and community reasons, or rather based on economic evaluations and convenience aspects of local food consumption. The studies found that ideology and community are only added benefits and not the

² Solidarity purchase groups are grassroot groups of consumers who aim to shop for food in a more direct and collective way (Grasseni, 2014).

main reason for joining the initiative (DeLind, 1999; Feagan and Henderson, 2009; Diekmann and Theuvsen, 2019). This shift is not only visible at the consumer side, but also at the producer's side. Oberholzer (2004) reported that “social aspects,” rather than “economic aspects,” were the driving force to use the CSA concept for only a minority of the CSA farmers. Thus, it is not surprising that there is rising critique that CSA is moving away from its original vision as a solidarity community towards new distribution models (Blätzel-Mink et al., 2017, p. 160; Diekmann and Theuvsen, 2019, pp. 105–106).

The previously elaborated understanding of solidarity highlights the need to deepen the interplay of economic and social aspects while allowing to go beyond alternative economic models (Fonte and Cucco, 2017, p. 293; Chiffolleau et al., 2019, p. 183). According to Chiffolleau and colleagues, this can be achieved by adding new indicators of wealth, “which enlarge the economic objectives beyond conventional attributes (fair trade beyond turnover...), express social goals (well-being, justice, equity, etc.) and design an expanded vision of the economy” (2019, p. 184). These thoughts are discussed in the research stream of Social and Solidarity Economies (SSE). The United Nations (2014) define SSE as “a broad set of organizations and enterprises that are specifically geared to producing goods, services and knowledge while pursuing economic and social aims and fostering solidarity.” The expanded vision within SSE is achieved by building social markets that avoid neoliberal economic logics (Espelt, 2020, p. 270). Laville and Amaro (2016) thereby highlight the potential of SSE as a basis for broad social innovation. However, SSE, in contrast to AFNs, still provide *alternatives within the market*.

2.3. Digitalization of collective food procurement

As we have seen, aspects of solidarity within CSA are characterized by the local; however, most CSA initiatives use global digital communication technologies to ease information flow (Forno and Graziano, 2014), which dissolves the strict local anchorage. Digital affordances allow citizens to participate in such initiatives without disturbing their “contemporary urban organization of everyday life” (Dal Gobbo et al., 2021, pp. 5–6; see also Fuentes, 2019). Digital technologies can be used in fostering sharing practices, and therefore redistributing existing food resources, helping to address issues of the current food system, especially in fighting hunger and food waste (Oncini et al., 2020). The possibility of connecting in online food communities through social media offers new opportunities for producers and consumers of food (Dal Gobbo et al., 2021). The authors highlight their argument by discussing how Facebook makes “alternative material flow” easier, as the social media platform can be the first point of contact for an urban citizen.

Recently, those opportunities afforded by digital platforms gained general attention by scholars investigating AFNs (Cui, 2014; Bos and Owen, 2016; Schneider et al., 2018). In particular, they highlight the possibility for consumer producer interactions, including digital food activism (Schneider et al., 2018; De Bernardi and Tirabeni, 2019), the potential for a wider public to get “access to sustainable good food” (Dal Gobbo et al., 2021, p. 8), the key role of Internet presence for the future of the agriculture industry (Cristobal-Fransi et al., 2020, p. 63), or the power of such tools to foster participation and to share

knowledge (Perlines et al., 2013). The question of how digital technologies shape and can contribute to the growth and spread of AFNs and social movements' visions, therefore, still remains open and warrants further research (Oncini et al., 2020).

However, digital platforms should not be treated as detached spaces, but rather as co-existing and constituting entities of physical spaces where alternative practices take place. Although meeting in physical spaces is crucial to social movements and AFNs, the scale of action within those communities highly increased based on the use of information and communication technologies (ICTs) for social communication (Bennett, 2003, 2012; Hoelscher and Chatzidakis, 2020). Still, members of Italian AFNs allocate ICTs little importance, as they represent for them an intermediary (Grasseni, 2014). These members clearly follow the previously introduced *food-as-means* approach, contrasted by the *food-as-end* approach (Dal Gobbo et al., 2021, p. 9). These contrasting approaches also reveal a critique towards digitally mediated AFNs, as they serve a convenient solution and therefore attract consumers who are aware of certain sustainability issues, but do not want to make an excessive commitment. We want to have a closer look at this phenomenon. Thus, we aim to highlight the plurality of food citizenships in AFNs in order to explore ways of doing solidarity and how digital platforms re-mediate these relational practices. To do so, we use the case of *Solveg*, a community supported agriculture initiative in Switzerland.

3. Ethnography of *Solveg*

To explore the everyday solidarity practices in community supported agriculture and how digital technologies remediate these, one of the researchers undertook an 8-month ethnography of the CSA initiative *Solveg*,³ a CSA group located in a suburban area in the German-speaking part of Switzerland. Its website states: “With *Solveg*, you receive fresh vegetables (BioSuisse certified) grown in our cooperative fields every week. We distribute what is growing in our fields to our members in about 150 baskets. Depending on the weather, it may be a bountiful or somewhat smaller harvest. *Solveg* involves working a minimum of 12 h per year and subscription in the vegetable fields and/or in another project area. This way, you get to know the garden team and the cooperative members, and know exactly how and where your vegetables grow.”⁴ The initiative is organized as a cooperative—which is a typical organizational and legal structure for CSAs in Switzerland (Dytrich, 2015, p. 271). Each member of the initiative is an associate of the cooperative. Five members form a so-called core group which is in charge of operational activities. They are elected during the yearly general assembly for an indefinite period. They meet every 2 weeks to discuss and decide on strategic and operational aspects of the initiative. On behalf of the cooperative, the core group searches for arable land and employs

³ The originally planned ethnography, which was to last 8 months, finished a few days before the first lockdown was announced in Switzerland. As Covid-19 brought in new interesting dynamics, sporadic field work was picked up again in August 2020 and lasts until today.

⁴ The website is only available in German, the quote was translated by the authors.

gardening professionals, who till the farmland and fulfil all the related tasks that are needed to run the initiative. Each member of the core group is responsible for a different area of organization, such as accounting, communication, or crop rotation planning, to name just a few.

Contrary to common agricultural practices in Switzerland, the initiative is not qualified for direct payments (subsidies) from the government, but rather relies on money from its members. Interested individuals sign up and pay a membership fee per year. They also acquire share certificates of the cooperative, which serve as investment capital for the project. Currently 151 households obtain their vegetable groceries from *Solveg*. The households vary heavily in terms of age and constellations, from young couples to residential communities, families and seniors. Each of these members can choose between three different sizes of vegetable boxes—small, medium and large—chosen in the beginning of the year. Every week the harvest is distributed equally among the CSA members, based on their basket size. While the production acreage is located in a suburban area, most of the members live in urban districts. Volunteers deliver the vegetable baskets to 13 urban district centers, where members of the initiative can pick them up. In addition, each member commits to 12 h of collaboration each year. Therefore, the members do not merely provide financial security to a certain farmer or initiative. Instead, they become prosumers (Boddenberg, 2018, p. 134) and take on some of the risks related to the production process, such as droughts, floods, or weather fluctuations in general, misplanning and staff absences due to sickness.

Solveg was selected because it is representative of CSAs in Switzerland, given the initiative's size, organizational form as cooperative and its organic standards, being part of the international solawi-network,⁵ and also given its accessibility. Access to the initiative was gained by an automated online subscription process, the manner in which any regular member would join. Prior to the first face-to-face interaction, the researcher contacted the core group to inform them of the research. During on-site activities, the researcher also verbally informed all present members about the research. Through this active participation, the first author developed a sense of how to become a member (Emerson et al., 2011, p. 3). The researcher saw herself in the role of documenting “the perspectives of the people involved in the events and settings” (Hammersey, 1992, p. 33). The first author observed the members in the field through open as well as targeted interactions in the field (Flick, 2018, p. 162). The aim was to highlight the varying practices in which the members engaged as part of their membership—from initial subscription to working on the farm or participating in events. The author took notes on her experiences in addition to taking notes on her observations of others, since it is essential to also document one's own experiences and practices as a participant observer and member of the group (Emerson et al., 2011, p. 15).

The observation phase started when the first author became a member. To conduct these observations, the author participated in regular activities of the initiative captured in field notes, following the three phases “descriptive, focused and selective” defined by Spradley (1980, p. 34). On that account, jottings were written during short research intermissions, which served as a basis for in-process memos that finally led to field notes. It needs to be acknowledged that the field notes reflect the perception of the author at the time they were composed, and thus reveal a subtle understanding of everyday life practices and concerns of members. The field notes were assembled in field note tales (Emerson et al., 2011, pp. 121–123). These autoethnographic insights enabled us to identify important themes and to see where digital technologies play a crucial role in the initiative.

To complement and enrich the observations, the first author also conducted ethnographic interviews to fathom the meanings behind the members' practices (Spradley, 1979, p. 5). During the process of conducting these *on the job interviews* it became obvious that they were not sufficient to fully address the research question, as there was not sufficient time for members to reflect on their practices and understandings during the farm activities. Thus, the first author conducted 12 semi-structured qualitative interviews with selected members. The selection of interview partners followed the rules of theoretical sampling developed by Glaser and Strauss (1967); accordingly, interviews were held with representatives of the core group, regular members and former members. The participants were recruited mainly during fieldwork, at an extraordinary general assembly and using follow-up e-mails afterwards. All members at *Solveg* were anonymized and we sought verbal consent as well as written consent for the interviews. Structured in four parts, the interviews started with a narrative stimulus in the form of a biographical question about their membership in the initiative, followed by questions on general eating practices, community, and finally, negative aspects of the initiative. Questions about the usage of digital technologies were asked as follow-up questions about their membership in the initiative and in the part on eating practices. The interview guideline was semi-structured and left room for follow-up questions. Data were collected in the form of digital voice recordings and transcribed verbatim at a later stage.

In the sense of theoretical saturation, the collection and evaluation of both the interview transcripts and the field note tales proceeded in parallel. In a first step, open coding was deployed to identify initial codes and thus identify first phenomena that needed to be confirmed within the second step where line by line coding was applied. Thereby, semantic and latent codes were generated and grouped in new categories based on relevant events (Emerson et al., 2011, p. 175). The results of this analysis are presented and discussed in the next chapter.

4. Food citizens' (digital) solidarity practices

4.1. Digital solidarity practices of *Solveg* members

This section provides an overview of (digital) practices of solidarity at *Solveg*. We will present these solidarity practices and discuss how digital technologies mediate them. In the second

⁵ The international network was founded in 2008 in the French speaking part of Switzerland. The German speaking part of Switzerland followed in 2011, and since then the initiative spread across the border to Germany and Austria. Currently there are several hundred CSA initiatives listed on the platform. Further information about the network platform can be found here: <https://www.solawi.ch/vernetzungsplattform/#/> (last accessed April 19, 2023).

subsection we show how digitally mediated solidarity practices do not play out identically for all members of the CSA.

A central characteristic of CSAs is the regular involvement of the community in their farming and related activities. The first author experienced this involvement autoethnographically, as a member of *Solveg*. We will draw on her fieldnotes to introduce short vignettes (in gray) describing typical activities at *Solveg*, and to present our thematic analysis of and reflections on the values guiding these activities. A regular activity for any *Solveg* member is to assist in the cooperative's farming activities. In our first vignette, we describe the organization of these work assignments.

In late summer, I receive an email from *Solveg* that reads: "Please plan your collaboration soon/early. It is very difficult to organize work if at the end of the season—when the main work is already done—people still ask for opportunities to help (we would like to send as few subscribers as possible a bill in November for hours not worked, even though we have nothing against a financial contribution). You can find current opportunities to help at any time at (link)." The link leads me to a Doodle survey, where I register for a slot to work in the field. After my registration, I receive an e-mail telling me what to wear and what to bring for the day; I was excited to go there, as it was a very welcomed change to my regular working days behind a laptop. A few days later, when I arrive at the farm, I receive further instruction from three gardeners together with a handful of other members. Our task for the day is to work in the potato field – an activity none of us have any experience with. The harvest of potatoes is over, we need to remove the remains of the plant, place it in a barrow, and bring it to the dunghill of the neighboring farm. Afterward, the farmer from the neighboring farm drives by with his tractor and plows the field for us. We are very grateful to him; while he needs 10 minutes for the 5 by 20 meter field, we would have worked by hand for a day, as one of the gardeners tells me while we watch the tractor. After that, we shovel trenches between the beds; for this we stretch long strings across the field, which we could use for orientation, and finally, we fertilize the new beds. After a full day of physical work in the scorching sun, I felt exhausted and every muscle in my body was aching. I commiserated with my fellow workers/members about the demanding work, but we all had smiles on our faces and shared a sense of achievement and pride looking at the field, ready to host new crops.

As I wrote in my field notes, this and similar work assignments on the farm not only created a sense of familiarity with farm work, but also with the cooperative and its other members. Most importantly, I changed my relationship with the food; I cherish the work that went into its production, and I am happy to know where and by whom the vegetables I consume are produced. Especially the vegetables I received from *Solveg* that day, which I could take home as a small thank-you for my work in the field, made me very proud. They were tomatoes that had reached the maximum ripeness and would no longer be edible until the next pick-up day. Thus, I ended my day with a tomato salad for dinner with my roommates. Upon reflection, it also made me realize that digital infrastructure, although mostly absent on the farm and in

the field, are present and play an important role in organizing farm work assignments.

Another regular activity for *Solveg* members, in addition to harvesting, is the preservation of produce. Some produce is not distributed immediately in its raw form to members, but rather is transformed into more durable food products, such as preserves, pickles or pesto. The second vignette reports on one occasion where the first author volunteered to preserve wild garlic in the form of wild garlic pesto.

It's spring in Switzerland and I'm volunteering in the *Solveg* farm kitchen with a group of six other *Solveg* members. One of the members joins every preserving activity of the initiative as she lost her job during Covid-19. Her knowledge of the different preserving methods is very valuable, and she will soon receive, after this day in the kitchen, an offer from the initiative to work as a gardener, which she happily takes on until she finds a new job. We are busy preserving wild garlic as pesto and start to realize that the blender we are using is not ideal for the large number of wild garlic leaves we intend to process. After a few rounds of blending the device heats up so much that we decide to briefly put it in the freezer to cool it down. Luckily, one volunteering member offers calling her husband and asking him to bring us their private blender. This causes a discussion among all the participants about the best and most powerful blender. The husband arrives with a Vitamix, and we continue our work without further interruption. During the coffee break, our discussion on blenders continues, and someone starts googling more information on blenders. She later shares the results of her Internet search via the chat app Signal. We all receive a link providing access to a website comparing different Vitamix models.

Once a year, *Solveg* hosts the so-called general assembly on the farm. During this mandatory meeting, the core group presents a review of the year and last year's accounts, the upcoming budget is voted on, new people are elected and other open points are discussed. All members are invited by email. Although this is a formal seated event with presentations and votes, the official part is introduced and followed by social events, where members can mix and mingle during lunch or subsequent afternoon coffee prepared from vegetables grown by the initiative and cakes that members bring.

It is the general assembly in November 2021 after a summer with low crop yields. The core group got many complaints from members regarding the quantity of vegetables they received, as during the summer, when the baskets are usually bursting with vegetables, there were only a few items in the baskets. They decided to address this during the general assembly. The reason was heavy rainfall, which resulted in flooded fields. Farmers in the region have spoken in the local media of a 50% crop loss. For *Solveg*, it was 40% compared to the average amount of vegetables from the last years, as a detailed Excel file containing the amounts of vegetables distributed in the last few years revealed. At the end of the month, the only time it is possible to cancel the membership, the moment of truth follows. Three times as many members as usual decided to cancel the subscription.

All three vignettes exemplify how solidarity is done in practice. They show that solidarity at *Solveg* unfolds in three different ways: **social inclusiveness, sharing and responsibility**. On the individual member's level, solidarity is often rooted and exemplified in **sharing practices** across the cooperative, which are deeply rooted in the vision of CSAs in general. These sharing practices are mainly centered around sharing *work, infrastructure and risk* to grow and, ultimately, share the produce. The sharing of *risk* by all members forms the basis of all activities at *Solveg*. Sharing the risk of harvest damage or loss, each member provides planning certainty to the farm by paying for the yearly vegetable consumption upfront and agreeing to back fluctuations in the harvest. The actual vegetable harvest results from shared *work* processes; conducted by all members of *Solveg*, including the core group and members and is supported by gardening employees. Sharing is also important regarding the required *infrastructure*, such as farm equipment and the farm kitchen.

Many of the above mentioned sharing practices were already identified in the 1990s (Fieldhouse, 1996; DeLind, 1999). However, the organization of sharing at *Solveg* changed drastically due to the introduction of digital technologies. Collaborative *work* is enabled by a planning software in order to prepare the cropping plan, among other things, and to know when the gardening team needs support from members. These work sessions are advertised over the community's website, and members can enroll over the linked Doodle survey. To better understand how the digital enrolment for the work unit has changed work sessions, we need to consider the origin of *Solveg*. In 2009 a group of like-minded people—centered around three gardeners—living in a shared house with a large garden decided to take a first step towards self-supply, as we learned from interviews with three members of *Solveg* who were involved very early on. The longest active member of the core group tells us “that [the shared living] was always strongly connected with the farm: ‘I live there, and I am a vegetable gardener,’ they [the gardeners] were explicitly asked to live there”⁶ (interviewee 1, 14.02.2020). Being physically close to the fields, the work needed was always visible and a few people were easily found to do it. Important decisions were made during the house meetings. While this vision of self-supply was never fully realized, the idea attracted a growing number of people from others in the neighborhood. The shift to using a digital platform for work enrolment meant that only a few people now are responsible for keeping track of the farm work and are in charge of finding people taking on the work. If no one enrolls, it is always the same people stepping in and acting as a back up. Often during field research, we waited in vain for people, who had registered for a work assignment via Doodle. A core group member also stated during a general assembly that it is more successful to contact members of the initiative directly when she needs support than to create a Doodle and promote it through the newsletter. Nevertheless, it is important to mention that coordinating work sessions without digital technologies would be challenging today, as *Solveg* is no longer a project among a group of friends but a CSA serving 151 households.

Independent of the size of the initiative, its ideology builds on shared **responsibility**. Members need to work at least 12 h for the

community (e.g., working on the field, harvesting, distributing the harvest, or helping out with communication tasks). If this requirement is not met, members need to compensate for these hours financially. A look into the yearly accounting reports of the initiative reveals that approximately 20% of members compensate their hours financially. This number remained stable from 2016 to 2020 and doubled in the year 2021.⁷ The financial responsibility is strengthened through the digital sign-up process and membership management. Responsibility for engaging in solidarity practices, on the other hand, decreases simultaneously. This can be seen, for example, in the complaints received, which, according to the communications manager, come largely from people who financially compensate for hours they did not work. One interviewee underlines this with the following statement: “There are those who did not deal with this community, who then report back: ‘This week I got 200 grams less vegetables’” (interviewee 5, 19.02.2020). She is sure that a person who has packed the vegetables into the baskets him- or herself would not make such a statement. However, the subtle badmouthing by active members of those opting for financial compensation can become a burden for some members. It can even be the reason for leaving *Solveg* and for not renewing the membership, as the following quote from a former member in his thirties illustrates: “Sometimes you take the easiest option and that's why I did not sign up again” (interviewee 2, 15.02.2020).

The CSAs farm properties not only serve as a production facility, but also as a place for social interactions and **social inclusiveness**. The initiative employs people who are social welfare recipients and reacts to critiques that view CSAs as elite; the price is set at a level that can be paid even by people that only receive disability pensions. In addition to this, the initiative fosters exchange between its members. The CSA, therefore, provides a space to discuss certain topics during input talks or guided walks along the farming properties, and to learn more about the food one consumes while working in the field. Especially for knowledge sharing, digital technologies play a crucial role. Participants of *Solveg* do not only use platforms to acquire knowledge (e.g., regarding the preparation of certain foods or the identification of certain vegetables), or to enroll for a work task, many members also join and get access to this initiative through online networks. Finally, digital technologies enable the exchange of ideas with like-minded people. This exchange is crucial for many members, and this is also true for a member in her thirties supporting the online communication channels of the initiative “I got more and more in contact with people, to exchange [opinions], because they are very exciting people, who are behind it, who have the same values [as me], because for me it is also a question of values, what is important to you in your life?” (interviewee 9, 02.03.2020). These exchanges can go beyond food-related topics. During the fieldwork, we participated in an activity to preserve zucchinis. Thereby, a small group of women started a very honest and touching conversation about miscarriages. Since then, they have been in a WhatsApp group and support each other in any kind of life situation.

⁶ The fieldwork was conducted in Swiss German, thus the verbatims were translated by the author.

⁷ It was also the year 2021 were the initiative reported an influx of new members and the highest deregistration rate at the end of the year. In addition, during Covid-19, all work-related activities could be carried out as planned, since most of the work is done outside or can be done individually at home.

Nevertheless, most members perceive digital technologies as incidental, which coincides with the perception of the members of the “Gruppi di Acquisto Solidale,” an Italian AFN studied by Grasseni, who allocate little importance to ICTs (Grasseni, 2014). However, members only get access to *Solveg* through a digitally automated sign-up process. Afterwards, digital technologies take on a mediating and enabling role. They are very important for coordination, especially to facilitate digitally mediated sharing practices, ensuring information flow and to spread the ideology. To conclude, we want to state that each member of a CSA is dependent on digitally mediated sharing practices, such as the enrolment for work units over Doodle, as this is shaped by solidarity practices on a systemic level. The extent, especially on the individual level, can vary, as we will elaborate on in the following paragraphs.

4.2. Varying forms of food citizenships within the initiative

As Grasseni mentions, there is no one way in which solidarity is embedded in the practices of the AFN she studied, so-called solidarity purchase groups; rather, each group interprets it differently (2014). However, for many members, the degree of solidarity and personal relationships decreases with the growing number of members within a group. Therefore, most of the groups aim to maintain a limited size (Fonte, 2013). Even in small communities, it can be a challenge to foster solidarity among members, which is crucial for collective action (Forno and Graziano, 2014). In our initiative, *Solveg*, we saw that the above-mentioned sharing practices mediated by digital media do not play out identically for all members; rather, members practice a specific form of food citizenship, which comes with varying shades of solidarity. In addition, the understanding can change over time, as the following quote of a highly engaged member shows: “I liked the idea behind it, that it’s a cooperative, that you are a consumer and a producer, and at first I was only a subscriber, and then I started to get more involved and then wanted to be more active” (interviewee 5, 19.02.2020). Thus, she evolved from being a pure subscriber or consumer-citizen to becoming a prosumer.

All the members are recipients of a weekly vegetable box. Thus, all are participating in a network that is seeking alternative ways of food provisioning. Some members mainly participate in order to get local, organic and fresh food and, thus, become a form of consumer-citizens or limited food citizens who mainly vote with their wallets. As all other members joining the initiative, these food citizens can be described as subscribers. Thereby, they mainly support systemic solidarity practices. On a systemic level, solidarity is rooted in the ideology, the core of the CSA initiative. We found that it is always an act of balance between acquiring sufficient members to being able (financially) to realize the ideology and to follow the ideology consistently. By buying share certificates at first to become a member, the systemic solidarity principles in the form of the CSA’s shared ideology are transactionally adopted. Thereby, basic aspects of solidarity, mainly sharing the risks, are met. However, besides the anonymous weekly vegetable pick-ups, CSA members only engage in digital practices, comparable to commercial transactions for regular food provisioning through digital platforms.

Other members engage in additional solidarity practices on an individual level. This ranges from joining community events,

exchanging information with like-minded people, or supporting the initiative with work hours, whereby these members become prosumers (Boddenberg, 2018, p. 134). For some members, food citizenship goes far beyond the initiative, for instance, by participating in local politics to contribute to a more sustainable food system. By adding more physical encounters, practices of solidarity become embodied in members’ everyday actions. The physical involvement is crucial to understand the responsibility towards such initiatives. Members who regularly work in the field report enhanced appreciation towards food in general. One member in her fifties who regularly volunteers explained to me that her relationship with food “has changed in such a way that it has become even more valuable. It has gained in content and ingredients; it was already taboo before to be thrown away, something is made out of everything and that is of course much stronger now” (interviewee 4, 18.02.2020). Therefore, active participation in a CSA can lead to developing a new relationship to food and its production. The new relationship is accompanied oftentimes by a higher sense of responsibility towards food and those who (co-)produce it, compared to conventional food purchasing. In this sense digital technologies contribute to a socio-material reconfigurations of food production and consumption, thereby supporting new cooking and eating practices.

Members voting with their wallets are increasing in number at *Solveg* with the growing use of digital technologies. Through the visibility of the global solawi-network and search engine optimization (SEO) work on the initiative’s website, the initiative attracts more and more members who can easily join through an online onboarding process. Thereby members who see *food-as-end* are also attracted; they resemble subscribers of other delivery services such as meal kits. Through the lens of these food citizens, AFNs resemble platform solutions that provide *alternatives within the markets*. In a follow-up discussion with a member of the core group responsible for membership management, we learned that compared to members who joined after physical contact, the fluctuation among the subscribers who found the initiative online is much higher. Through an increased digital presence, the recruitment of new members as subscribers grows and blurs the understanding of *food-as-end* or *-means*. In addition, we could identify a shift in the initiative from being a pure AFN to a niche player in the SSE.

5. Conclusion

In this paper, we foregrounded the continuum of food citizenship in AFNs in order to explore solidarity practices and the manner in which digital platforms re-mediate these practices. Based on an 8-month ethnography and additional semi-structured interviews, we were able to show that members of *Solveg* take on different forms of food citizenships. By becoming a member, one becomes a food citizen in the form of a subscriber mainly voting with one’s wallet. Additionally, all subscribers have the possibility and duty to engage in farm work or financially compensate for it. If practices around work are strengthened, the subscriber tends to become a prosumer. Each member has a different understanding of *food-as-means* or *-end*; members who see themselves as pure subscribers tend to relate to *food-as-end*, while those active in the core group relate to *food-as-means* as a solidaristic vision of a future food system. As we showed

and discussed, members' practices and the respective form of food citizenship within the initiative can also change over time.

Physical contact with the initiative, food production or preservation, or other forms of active engagement on the farm are important for enhanced feelings of responsibility towards food and other beings, a crucial aspect of solidarity in practice. Our study also identified two additional aspects of solidarity practices: social inclusiveness and sharing. Sharing, risk, work and infrastructure are at the core of many solidarity practices. Each practice that goes beyond the subscription, such as working in the fields or joining community events, enlarges the scope of solidarity by supporting social causes and by taking on some voluntary responsibility serving the community. Thus, each member engages in a different set of practices around food citizenships, depending on existing household and food practices. Through new food, household, or work practices, different socio-material reconfigurations of everyday life take place, which can lead to a shift in values. This is not only the case with AFNs, but also with other food providers added to a household's food routine, such as Farmy.ch or meal box schemes, the platforms mentioned in the introduction. However, they have different affordances than digital technologies used to support an AFN, and thus enable different forms of food consumption or citizenship.

Digital technologies are not perceived as important by the members of the study's CSA initiative. Nevertheless, neither the digital spaces nor the physical spaces can be treated as detached; rather, they are co-existing and co-constituting entities of the CSA. Digital technologies foster solidarity practices, as they ease communication and coordination among members, ranging from the online onboarding process, through the search for recipes for unknown vegetables, to the enrolment for working hours. In addition, the number of subscribers increases through digital technologies, transforming *Solveg* from an *alternative to the market* to an *alternative within the market*. Digital technologies blur market boundaries and move this CSA slowly towards being a player in the SSE. Thus, our study contributes to the emerging field of digital food studies by showing how solidarity is digitally enabled and negotiated in CSAs and how this impacts food citizenship.

Data availability statement

The datasets presented in this article are not readily available because we have assured study participants as part of the informed consent process that their data will not be shared with third parties. However, based on a formal request, we can evaluate on a case-by-case basis if partial qualitative data can be made available to interested

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researchers. Requests to access the datasets should be directed to Aline Stehrenberger, aline.stehrenberger@unisg.ch.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

Author contributions

AS and TS collaborated on the conception and design of the study. AS conducted the field work, analyzed the gathered data, and discussed it with TS. TS closely supervised and supported the data-gathering process. AS and TS wrote different sections of the manuscript and contributed to manuscript revision, read and approved the submitted version.

Acknowledgments

The authors would like to thank Giada Danesi and Anna Mann for their thoughts on an early article draft reporting on the ethnography of *Solveg* and Marie Poux-Berthe for her helpful feedback on an earlier version of this paper. The authors also thank the reviewers of this article for their reading and constructive feedback. Special thanks go to the members of the *Solveg* CSA initiative, who dedicated their time to participate in our study.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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RECEIVED 15 March 2023

ACCEPTED 30 May 2023

PUBLISHED 16 June 2023

CITATION

Nayak R and Hartwell H (2023) The future of charitable alternative food networks in the UK: an investigation into current challenges and opportunities for foodbanks and community markets. *Front. Sustain. Food Syst.* 7:1187015. doi: 10.3389/fsufs.2023.1187015

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The future of charitable alternative food networks in the UK: an investigation into current challenges and opportunities for foodbanks and community markets

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This study examines the potential of charitable alternative food networks (ANFs), specifically community markets, as a complimentary solution to existing food aid efforts in response to food insecurity. While foodbanks play a crucial role in providing emergency food aid, they often face challenges in terms of supply shortages, limited food variety, and perpetuating dependency on food aid. Moreover, foodbanks may only offer temporary relief without addressing the root cause of food insecurity. Community markets, on the other hand, adopt a social economy approach and aim to empower local communities by providing affordable food options to all community members. These markets operate on a different business model than foodbanks and offer additional vouchers for those who cannot afford to purchase food. Community markets also focus on promoting social and economic goals and often provide additional services and activities within the community centers. By assessing the perspectives of beneficiaries of foodbanks and community markets, the paper examines the dimensions of food security (availability, access, utilization, and stability) in the context of both charitable ANFs and highlights the potential of community markets and foodbanks to address these dimensions. While there is ongoing debate about categorizing food aid programmes as ANFs, both share the goal of reducing food insecurity and promoting sustainable and equitable food systems. Ultimately the paper argues that community markets offer a more sustainable and empowering approach to addressing food insecurity by addressing its underlying causes and promoting community resilience.

KEYWORDS

food security, food poverty, foodbanks, community markets, food aid programme, social sustainability, alternative food networks, sustainable business transformation

1. Introduction

The Food and Agriculture Organization (FAO) defines food insecurity as the lack of “regular access to enough safe and nutritious food for normal growth and development and an active and healthy life” (FAO, 2020). The [World Food Programme \(2022\)](https://www.fao.org/world-food-programme-2022/) estimates that ~828 million people go to bed hungry every night, thereby, not having access to adequate safe and nutritious food. While acute global food insecurity has increased from 135 to 345

million since 2019, ~49 million people across 49 countries have experienced famine-like conditions in 2022. To tackle this issue of food insecurity, many economically developed countries have started relying extensively on charitable food aid programmes that provide emergency food parcels to people in need. The most commonly utilized charitable food aid programme is foodbanks (Middleton et al., 2018; Lambie-Mumford, 2019). According to a report by YouGov Plc (2022), 18.4% of British households experienced moderate to severe food insecurity in September 2022 while one in four households with children had experienced food insecurity between the first 2 weeks of lockdown and September 2022. The survey further indicated that households that were food insecure were more likely to be affected by rising fuel prices—increasing energy costs led to 59.5% of households using less appliances for cooking, 41.1% eating their meals cold, 18% washing dishes in cold water, and 6.8% turning appliances such as refrigerators off. 68.1% of households in the UK were worried about the impact of the cost-of-living crisis on their ability to be food secure and therefore to overcome household food poverty, many households access foodbanks.

1.1. Foodbanks

Although foodbanks around the world play a critical role in providing food assistance to people in need, the specific ways in which they operate vary based on the local context and available resources. For example, while foodbanks in the US act as storage units that distribute food to food pantries, often through a network of smaller agencies such as places of worship and community centers (Santini and Cavicchi, 2014; Charania and Li, 2020; Byrne and Just, 2022), foodbanks in the UK usually have a more centralized distribution system (i.e., interacting directly with beneficiaries), resembling American and Canadian food pantries (Loopstra et al., 2015; May et al., 2020). Foodbanks in Europe distribute food through a variety of channels—while some utilize their own warehouses and distribution centers, others rely on partnerships with charities and social services (European Food Banks Federation, 2022). The size and scale of food banks also differ between countries—the largest food bank in the US, the Houston Food Bank, served more than 150 million meals in the 2021 financial year (Houston Foodbank, 2022), while the largest network of food banks in the UK, the Trussell Trust, distributed ~2.1 million emergency food parcels to people in crisis in the same period (The Trussell Trust, 2022c). In 2021, the European Food Banks Federation (FEBA) fed ~11.8 million individuals across 29 European countries (European Food Banks Federation, 2022).

According to The Trussell Trust (2022a,b,c), 2.2 million emergency food parcels were distributed across the UK by Trussell Trust foodbanks to individuals and families in need between April 2021 and March 2022. In addition to the ~1,400 Trussell Trust foodbanks, the British population also relies on emergency food parcels distributed by a network of at least 1,172 independent foodbanks (a part of the Independent Food Aid Network—IFAN; Irvine et al., 2022). A large proportion of the beneficiaries accessing foodbanks in the UK were in receipt of some form of state benefits such as Universal Credits (Lambie-Mumford, 2019;

Independent Food Aid Network, 2022; The Trussell Trust, 2022a). While over half of the households on universal credit experienced some form of food insecurity in 2022 (YouGov Plc, 2022), 94% of the foodbanks associated with IFAN reported increased utilization of their services from other disadvantaged individuals (Independent Food Aid Network, 2022). The adopted political-economic trajectory of social policy change has contributed to increased austerity measures which when coupled with welfare reform, has resulted in foodbanks being embedded within local welfare landscapes (Lambie-Mumford, 2019).

Foodbanks rely mostly on donations made by individuals, local fast-food outlets, and retail stores (Bennett et al., 2021). However, even before the current financial crisis, demand at foodbanks often outstripped supply (Iafrazi, 2016, 2018; Gharehyakheh and Sadeghiamirshahidi, 2018). The current situation propelled by an incorrect assessment of the nature and consequences of shocks during a period of worldwide instability, has caused a decrease in the volume of food donated (Gorb, 2022; The Trussell Trust, 2022c). This has resulted in shortages in food supply, inflation leading to an increase in prices of food, and people being unable to afford basic necessities such as food and energy (Harari et al., 2022; Reis, 2022).

Research investigating the limitations of food banks has been ongoing for over two decades (Poppendieck, 1999), although it has gained momentum recently (e.g., Loopstra et al., 2015; McIntyre et al., 2016; Bennett et al., 2021; Byrne and Just, 2022; Dekkinga et al., 2022; Etherington et al., 2022; Williams and May, 2022). Current studies on foodbanks debate their impact on public health (e.g., Garthwaite et al., 2015; Garthwaite, 2016), their correlation with religion, beliefs and religious organizations (e.g., Cameron, 2014; Allen, 2016), their impact on social policy (e.g., Lambie-Mumford, 2019; Bramley et al., 2021), and their impact on an individual's identity, self-esteem and dignity (Hicks-Stratton, 2004; Soja, 2010; Booth, 2014; Pine, 2022; Riol and Robinson, 2022). The limitations of foodbanks can have significant consequences, particularly for vulnerable populations who rely on food aid programmes.

The inability of such programmes to empower beneficiaries to become self-sufficient leading to dependency among beneficiaries and long-term reliance on food aid has been highlighted as a critical drawback (Lentz et al., 2005; Garthwaite, 2016). Mould et al. (2022) emphasize the phenomenon where several governmental bodies are relinquishing their obligations to adequately allocate funds toward social welfare by expecting mutual aid programmes (e.g., food aid programmes) to tackle national welfare-related challenges without support from the state. Additionally, the reliance of food aid programmes on food donations leads to limitations in the variety and quality of food provided (Tarasuk, 2014; Drewnowski et al., 2020) resulting in poor nutrition and health outcomes (e.g., diabetes, asthma and obesity) among adults and children (Cook et al., 2004; Garthwaite et al., 2015; Loopstra and Lalor, 2017; Nguyen et al., 2017; Drewnowski, 2022).

Furthermore, some studies have associated food aid programmes with stigma and shame (Garthwaite, 2016; Middleton et al., 2018), while seldom addressing the root causes of food insecurity such as racism (Bowen et al., 2021), poverty (Drewnowski, 2022), inadequate access to education

(Bowden, 2020), and lack of employment opportunities (Loopstra et al., 2019). Consequently, food aid programmes may only provide temporary relief to hunger without addressing the underlying systemic issues that perpetuate food insecurity. Thus, while food aid programmes that rely on the foodbank model can provide relief to vulnerable populations, they should be implemented alongside other interventions to address the underlying causes of food insecurity.

1.2. Community markets

To overcome the pressures faced by foodbanks and their limitations in the UK, an alternative charitable food aid model based on the principles of a social economy, called *community markets*, has been adopted by local communities and community hubs. The purpose of these community food enterprises is to empower local citizens through “collective mobilization of local resources” (Sonnino and Griggs-Trevarthen, 2013, p. 272). The principles of community markets closely align with those of Community Food Systems (CFS) which is, “to oppose the structures that coordinate the current food system and to create alternative food systems” (Allen et al., 2003). Community markets demonstrate “the feasibility of a socially needs-based, humane and human-centered economy within contemporary capitalism” (Hudson, 2009, p. 507). They often adopt a different business model to that implemented by foodbanks. Access to such markets is not means-tested—i.e., all people from a local community, regardless of their socio-economic status, are able to take advantage and are not required to obtain an agency referral, unlike food banks. However, those who are unable to purchase food even at subsidized prices can be referred and are given a voucher with a predetermined value based on household size. While there is no standardized operational model for community markets, most follow an operational design that mimics a supermarket—i.e., beneficiaries are allowed to choose items (food, toiletries, and other household essentials and meats) at subsidized rates. Charitable food distribution networks such as FareShare are subscribed to using revenue generated from beneficiaries, allowing for a regular supply of food to be received. Additionally, community markets receive donations from supermarkets, local producers and other local businesses such as alternative meal providers. Community markets are often located within community centers. Hence, in addition to markets, these centers also provide additional services (e.g., cooking, sewing, chair yoga, and music classes). This allows engagement by a larger section of the local community. Much like foodbanks, community markets prioritize social, and economic goals over profit generation. Additionally, community markets engage with local businesses (i.e., reduced food miles) to reduce food waste and carbon footprint (e.g., distribution of excess food to local fire and police services), support local producers, and promote healthy food, community engagement, and education. This highlights the potential of community markets to contribute toward a reconstructive green economy (Smith, 2005, p. 275; Golob et al., 2009).

1.3. Dimensions of food security

Food poverty refers to individuals’ and households’ inability to obtain an adequate nutritious diet whilst maintaining dignity (Dowler, 2003), and is closely linked to an individual/household’s economic standing, where the two create a vicious cycle with each fueling the other (Siddiqui et al., 2020). Food insecurity is a broader concept that encompasses physical and economic access to food, as well as the availability, quality, and safety of food, which can lead to inadequate or insufficient food consumption (O’Connell et al., 2019). Despite the intention of AFNs to address the issue of food insecurity (Cerrada-Serra et al., 2018), the extent to which they fulfill the four dimensions of food security, namely availability, access, utilization, and stability, as outlined by FAO in 2008, remains unclear. These dimensions of food security are applicable worldwide and provide a framework for evaluating the effectiveness of AFNs. *Food availability* refers to the physical presence of food within a certain geographic area. It addresses the supply chain aspect of food security (World Food Summit, 1996). When applied to the AFN context, it would measure the amount of food made available to people within the food aid system. This would include the quantity and variety of nutritionally balanced food available for distribution, as well as the frequency and consistency of food donations. *Food access* refers to the physical and economic access to food that encompasses individuals and households’ ability to acquire and consume adequate, nutritionally balanced, and diverse diets (Dutko et al., 2012). In the AFN context, this would include physical and economic access to the food provided by the AFNs. Physical access refers to the proximity of the AFNs to beneficiaries, and the ease of transportation to reach it. Economic access refers to the affordability of the food provided by the AFNs. This implies that even if the AFN provides nutritious food, if beneficiaries cannot afford transportation, energy (to cook and store food), or if the food is not culturally appropriate, it is not accessible to them. *Food utilization* refers to the ability of households and individuals to utilize food effectively once it is available and accessible. It includes the knowledge and skills to prepare and store food safely and use it in a way that promotes good health and wellbeing (Food Agriculture Organization, 2003). In the AFN context, it would encompass having access to cooking facilities, availability of necessary resources such as utensils and ingredients, and the knowledge to prepare and store food safely. In addition to providing food, AFNs may need to provide additional support, where needed, in the form of cooking classes, recipes, and workshops on writing grants to secure funding for purchasing cooking equipment. *Food stability* refers to the ability of individuals and households to consistently access sufficient quantity and quality of nutritious and diverse food over time, without experiencing food insecurity (Food Agriculture Organization, 2008). In the AFN context it refers to the ability of AFNs to provide food assistance on a regular and reliable basis while prioritizing nutritious and healthy food options and building resilience within communities such that they can withstand shocks and stressors (e.g., inflation) that may affect food access and utilization.

By drawing on the lived experience of beneficiaries of food aid programmes, this paper aims to explore and evaluate community

markets, an alternative community feeding programme, as a potential complementary solution to an existing and widely utilized food aid effort, foodbanks, to address the multidimensional aspects of food insecurity in the UK.

1.4. Alternative food networks and food aid programmes

Alternative food networks (AFNs) are a range of food systems that aim to offer an alternative to the mainstream industrialized food system by providing more ethical, sustainable, and equitable food options. These diverse systems have emerged in response to the unsustainable practices within traditional industrial food systems (Holloway et al., 2006; Kizos and Vakoufaris, 2011) which have contributed to multifaceted contradictions such as malnutrition, ecological and livelihood crises (Goodman et al., 2012). According to Feenstra (1997), Jarosz (2008), and Ribeiro et al. (2021), AFNs are often associated with values such as social justice, ecological sustainability, healthy eating and a closer relationship between producers and consumers. These values are supported through various strategies such as farmer's markets, community supported urban agriculture, and food cooperatives (Stella et al., 2022).

There is a growing body of literature suggesting that foodbanks and other charitable food aid programmes can be categorized as alternative food networks (AFNs; DeLind, 2011; Brinkley, 2018). However, this categorization is not without controversy as some scholars argue that food aid programmes, especially foodbanks, are fundamentally different from other forms of AFNs due to their reliance on surplus food donations rather than direct sourcing from farmers and other local producers (Lambie-Mumford, 2013; The Trussell Trust, 2023). Despite this debate, there are similarities between food aid programmes and AFNs in terms of their shared goals of reducing food insecurity while ensuring environmental and localized socio-economic impacts using hybridized and conventional systems through advocacy of collective action at different levels (Goodman et al., 2012; Midgley, 2014; van der Horst et al., 2014; Cerrada-Serra et al., 2018; Michelini et al., 2018). Furthermore, the rise of alternative models to the foodbank model, such as community markets, to supplement traditional operations and provide sustainable solutions to food insecurity (Maric and Knezevic, 2014; Michelini et al., 2018; Knezevic and Skrobot, 2021), further highlights the association between food aid programmes and AFNs. Therefore, it is reasonable to consider food aid programmes, such as foodbanks and community markets, as types of AFNs and to evaluate their effectiveness in addressing food insecurity, as proposed in this study.

2. Methods

2.1. Sample characteristics and participation

Four senior leaders, each from a different charitable AFN, received information about the study via email between February

and April 2022. Upon agreeing to be involved in the study, senior leaders distributed flyers with information about the research to stakeholders. These included beneficiaries (i.e., users accessing services provided by charitable AFNs), volunteers, employees and senior leaders. All participants were informed that their decision to/not take part in the study would have no impact on their association with the organization. Participants were recruited between May and July 2022.

2.2. Recruitment

Recruitment philosophy was inspired by the approach proposed by Urban and van Eeden-Moorefield (2018) and Creswell and Clark (2017) who state that individuals considered best qualified to address the research question appropriately should be recruited in a study. As the roles of stakeholders associated with charitable AFNs varied, a sampling strategy suggested by Wilson et al. (2015, p. 2,131) was adopted. Beneficiaries of food aid programmes with varied but relevant experiences of utilizing foodbank and community market services were recruited from four food aid programme—three foodbanks (Leicestershire, Shropshire, and Dorset) and one community market (Leicestershire). Participants included beneficiaries who accessed AFNs for food as well as other services (debt management and community classes) offered by the service provider.

To ensure a good working knowledge of charitable AFNs, beneficiaries with an active association with a charitable AFN were recruited for the study. Recruitment was through voluntary response sampling, enabling the involvement of participants who were willing to share sensitive information of their own accord (Murairwa, 2015). Table 1 highlights details of participants' background and association with charitable AFNs.

2.3. Data collection

A semi-structured interview schedule was developed and reviewed by both authors. It consisted of three sections: Section 1 included demographic questions that explored participants' financial status (i.e., employment status, debt and amount of disposable income); Section 2 explored participants' experience with the charitable AFNs; and Section 3 consisted of questions associated with the four dimensions of food security.

A total of 38 semi-structured interviews ($n = 38$) were carried out between June and July 2022. Interviews lasted between 30 and 45 min and were digitally recorded.

2.4. Data analysis

Recorded interviews were de-identified and transcribed verbatim. Deidentified transcripts were imported into a data analysis software package, QSR NVivo (Version 12). Using an inductive thematic coding approach as described by Braun and Clarke (2006), the transcribed interviews were analyzed to facilitate the identification, analysis and reporting of patterns

TABLE 1 Study participants' backgrounds and associations with charitable AFNs.

Stakeholder type (employment)	Number of participants	Income source (left over after paying energy bills ^a)	Income left over after paying energy bills and rent/mortgage installments (foodbanks)	Income left over after paying energy bills and rent/mortgage installments (community markets)
Beneficiary [retired]	4	Pension	£0	<£100
Beneficiary [not working due to disability]	8	Universal Credits	£0	£0–£40
Beneficiary [unemployed]	8	Universal Credits	£0	£0–£40
Beneficiary [volunteers at other charities]	6	Universal Credits or Partner	£0	£0
Beneficiary [working full time]	5	Primary jobs	£0–£150	£200–£3,000 ^b
Beneficiary [Zero-hour contract]	7	Primary job and Universal Credit	£0–£20	NA

^a As of summer 2022.

^b This was a dual income household with both adults in full time jobs.

TABLE 2 Coding framework.

Themes	Macro-code	Micro-codes
Food availability	Foodbanks Community markets	Volume of donations Fruits and vegetables
Food access	Foodbanks Community markets	Accessibility Social stigma Referral process Access to other services
Food utilization	Foodbanks Community markets	Management of nutritional intake Compatibility with cooking equipment
Food stability	Foodbanks Community markets	Stable access to food

within the data (Flick, 2014). The adoption of this method allowed for the grouping of themes to make comparisons between the data more straightforward. A preliminary list of codes was developed by the first author. The codes were then reviewed by the second author. While both authors are public health researchers, the first author has experience in food security and sustainability and the second author has experience in nutrition particularly as it relates to food security. Upon identifying the preliminary list of codes, the authors exchanged and reviewed the outputs. Any disagreements were resolved through discussion until consensus was reached. The preliminary list of codes and the coding framework are highlighted in Table 2.

2.5. Ethics approval

This research received approval from the relevant ethics committee where the two authors were employed at the time of data collection. Written informed consent was obtained from all participants.

3. Findings

The subsequent section presents the findings of the investigation into the effectiveness of foodbanks and community markets in addressing food security in the UK by exploring the lived experience of beneficiaries.

3.1. Food security, foodbanks, and community markets

Much like food (in)security, food poverty can be associated with the FAO's four dimensions as defined in 2008. This section discusses the ability of foodbanks and community markets to address food poverty, and the four dimensions of food security.

TABLE 3 Differences between social supermarkets and community markets.

	Social supermarkets	Community markets
Concept	Source surplus food (e.g., damaged packaging and missing/incorrect labels).	Prioritize local sourcing, sustainability, and community engagement.
Target audience	Individuals and families on low incomes and/or are facing food and financial insecurity.	Open to the entire community including individuals with different income levels.
Business model	Non-profit organizations Rely on partnerships with food suppliers, financial donations, and grants for sustenance.	Operate as cooperative or community-led initiatives with the involvement of local producers, industries, and vendors. May rely on membership fees.

Sources: Field (2009), Holweg et al. (2010a,b), Renobales et al. (2015), Knezevic and Skrobot (2021), and Nkegbe and Mumin (2022).

It is important to note that specific characteristics and practices of community markets and social supermarkets may vary depending on the context and region in which they operate.

3.1.1. Food availability

Beneficiaries highlighted that the cost-of-living crisis had forced many UK-residents from low- and middle-income households to rely heavily on food aid programmes.

Families needed to visit during very specific times to ensure food availability. If a narrow window was missed, they often left the charitable AFN without adequate food, thereby forcing them to spend money on cheap and high fat-high sugar foods in supermarkets. An increasing reliance on such programmes coupled with a reduction in the quantity donated resulted in furthering the food poverty and insecurity issue:

“It all depends what time you come really because if you come just after a delivery [of donations] or very early, you will have more food available. However, if you come at any other time once a lot of people have already been, the stock levels are going to be low.”—Beneficiary 9

3.1.1.1. Foodbanks

Many foodbanks received food through donations made by the public. With increasing food prices, the quantity of food donated decreased in 2022 (The Trussell Trust, 2022b) which led to a depletion in access to foods such as tinned vegetables and meat:

“Stock levels vary on the day because it depends on what they [community feeding programmes] get in. By the time I visit the food hub... the food is virtually gone, the fresh stuff, in the fridge, meat and stuff. I know they are all donations, so it all depends on what they’re getting...”—Beneficiary 8

Beneficiaries referred to foodbanks did not visit with the expectation of receiving vegetables and fruits as access to such products was often limited. In addition, they were not always able to purchase these from budget supermarkets as they are relatively more expensive. Consequently, fruits and vegetables were commodities seldom consumed:

“We don’t always get vegetables and fruits here. The amount has reduced since everything has become expensive. I guess it makes sense as people will struggle to donate these items. I go to the supermarket to see if they have cheap vegetables and fruits for my children. However, sometimes I replace it with a cheaper product [alternative] like tinned or packet food.”—Beneficiary 14

3.1.1.2. Community markets

Beneficiaries visited community markets to purchase a variety of food. However, fresh fruits and vegetables, and frozen meat were a priority as these items were deemed to be nutritious and expensive in supermarkets and unavailable in foodbanks:

“I come here mostly for the carrots, potatoes, tomatoes and cucumbers. Most times they have these in stock. Sometimes I also buy pasta and bread. It depends on what they’ve got. Sometimes they have meat in the fridges.”—Beneficiary 1

“I suppose really, it’s the fresh meat which helps because it is cheaper here and obviously, I would buy it here. It also reduces the amount I need to buy at supermarkets.”—Beneficiary 8

3.1.2. Food access

3.1.2.1. Foodbanks

Foodbank beneficiaries expressed gratitude for receiving free food in the form of food parcels, even though they felt the loss of dignity due to the inability to choose the food items they received. Nonetheless, beneficiaries found that food banks provided greater accessibility to food than sources such as supermarkets:

“I am grateful for what the foodbank gives me as it means that I have some food for myself and my family, especially when I cannot afford food from elsewhere. I don’t know what I would have done without this...I cannot afford to shop at supermarkets...”—Beneficiary 36

Nevertheless, beneficiaries of foodbanks stated that there was a social stigma associated with accessing food in the form of food parcels as it was free and distributed as pre-packed parcels. Many beneficiaries felt “looked down upon” by society and were “ashamed” to mention that they received food parcels from foodbanks:

“Well, it’s a bit of a stigma. Sometimes it’s very difficult [to visit a foodbank]. We’ve always worked and now all of a sudden, we need to get free food. I feel ashamed to tell my friends...”—Beneficiary 17

Referrals played an important role in ensuring access to charitable AFNS, both foodbanks as well as community markets. Referrals were often in the form of food vouchers or online forms prescribed by referral agencies. Beneficiaries perceived receiving

referrals as a complicated process due to: (1) the lack of information on referral agencies; and (2) a lack of awareness about the need for referrals in most cases.

Despite food banks limiting the number of visits by an individual or household, some beneficiaries found a loophole in the referral process by receiving multiple referrals from different agencies, which allowed them to access food from different food banks and receive more than one food parcel per week:

“Currently, I am using two foodbanks around Leicester city. I just go to two different agencies, my doctor and housing officer, to get two separate referrals. . . This helps me feed my family for a longer period.”—Beneficiary 12

Beneficiaries visited foodbanks not just for access to food, but also for information on other agencies that could provide additional help such as debt management. However, advice on debt management was not a service associated with community markets:

“Once I get food from here [foodbank], I visit the person offering debt management advice to get help with paying off outstanding bills. The staff here are very informative and often share information about other places where I can get help. I can get in contact for fuel and food vouchers for like Asda and things like that so you can get fresh food—this is amazing.”—Beneficiary 19

In addition, foodbanks added social value as they helped beneficiaries meet other people in the same financial situation as themselves:

“... Whenever I have no work, I always come here and collect whatever food I can get... It helps to know that there are other people experiencing similar difficulties, and that I am not the only one who is unable to feed my family sometimes.”—Beneficiary 13

3.1.2.2. Community markets

Although community markets receive donations of fresh fruits, vegetables and dairy, physical access is often limited due to unsuitable storage conditions:

“... there's not a lot of fresh things mainly because there is nowhere to store it for too long. A few weeks ago, I came and there was just lettuce, so I could not get any fresh products. . . I have never seen fresh cold milk here...”—Beneficiary 10

Community markets offers food at a subsidized rate, enabling beneficiaries to purchase a wider range of items within their limited budget:

“I can buy different food and other household essentials here [community market] although I come here on a budget. . . If I go to a supermarket, I will hardly get even half the shopping done. . . I have accessed food from foodbanks, but the variety was nowhere close. . .”—

Beneficiaries preferred the approach adopted by community markets where they had the option of choosing food and paying for goods as opposed to being given a pre-prepared parcel for free

as not only did they get to choose the products based on their preferences, but also felt a sense of dignity in not being handed out free items:

“...I can choose fresh and healthy food from here [community market]. I can buy what I will eat. However, I would not be able to choose at a foodbank and would end up wasting food and not eating things I did not like.”—Beneficiary 9

“I very much prefer being able to choose my food instead of being given parcels like at XY foodbank, It just feels dignified to be able to pay for goods, even if it is at subsidized rates, and then being able to choose what I want based on what I would like to eat.”—Beneficiary 17

As access to community markets is not means-tested, people from across socio-economic backgrounds visited the markets. This often led to people from different walks of life interacting with each other. They valued the “sense of community” and other services offered and developed new friendships and social circles by visiting the community hub while attending classes and the market. It also helped to combat loneliness and feelings of isolation:

“The other thing that being at SS1 [community market] is that it has really opened my eyes to different people who come for different reasons, but they are not what I expected. This is going to sound very class conscientious, but I thought that people who would come to the market. . . would be very needy, not only financially but mentally as well but it isn't like that. . . I have realized that all of us could go through similar mental health-related issues regardless of our income level. . .”—Beneficiary 6

“You get a sense of community here... because they [food market and community hub] serve the local community. If we lost this [market], it would be a shame because they bring so much to our lives. My daughter comes here for the playschemes. Because I'm a single mum it just gives me that bit of a break in holidays. It will be a shame if it ever goes. Food-wise its somewhere I can come and get some if I'm short 1 month. I know I can come here and get some good quality food for less than what I can get in the shops.”—Beneficiary 1

Limited opening hours was highlighted as a key issue as this made it difficult for beneficiaries with busy schedules to access community markets:

“I wish the market was open on more days. By the time I finish work, I am hardly able to visit the market before it closes. . . it is only open 2 days a week, that too only for a few hours each day. . .”—Beneficiary 6

3.1.3. Food utilization

With increasing food prices, many households did not have much access to nutritious diversity. Adults had further limited access to healthy nutritious food as in many households, they had no option but to eat food left-over from their children's plates, with some adults skipping meals to feed their family. This was a common theme across foodbanks and community markets:

“There have been a few times [since the prices have gone up] that I’ve had had little and whatever was left in my daughter’s plate. Because as far as I’m concerned, she has priority over me. I always make sure she’s fed. I cannot afford to waste money.”—Beneficiary 16

Although most adults were cognizant of the importance of nutritious meals, many felt that it was something they could not afford to prioritize:

“Nutrition is an important concept in my family. I have been taught about the importance of eating different food groups... I cannot afford to buy fresh fruits, vegetables and fish as their prices have gone up a lot. This is in addition to having to pay for increased electricity and gas bills.”—Beneficiary 15

It was highlighted that while increasing food prices had directly impacted the amount and type of food accessible to the average UK household, the cost-of-living crisis had flexed cooking habits. Increasing electric and gas (i.e., fuel) prices required many households to purchase foods that could be prepared without the use of a hob and/or oven. The sales of air fryers and slow cookers has increased as they utilize less electricity (Al-Habaibeh, 2022). Subsequently, this has led to families accessing community markets purchasing foods that could be used in this way:

“...I don’t buy half as many ingredients as I used to from here [community market]... I only use my slow cooker once rather than putting the oven on every day and I have bought an air-fryer as well...”—Beneficiary 4

3.1.3.1. Foodbanks

Beneficiaries with co-morbidities such as hypertension and diabetes often struggled with food received in foodbank parcels as they found it difficult to manage their salt and sugar intake:

“A lot of the tinned foods is quite high salt which I can’t take at the moment because of certain health issues that I suffer from.”—Beneficiary 20

Limited food access and availability in foodbanks led to an over-reliance on carbohydrates due to their relatively lower costs and longer shelf lives but also compounded a diet anchored in monotony:

“Sometimes there is enough options, but very often, the options are the same. This can be good for a while as it helps me decide what I am going to eat, but it gets boring. I cannot do anything about it as it comes in my food parcel as that is what foodbanks get donated.”—Beneficiary 23

The lack of beneficiary choice regarding food items in food parcels at foodbanks resulted in some items being incompatible with air fryers and kettles, leading to non-utilization due to the inability of affording to cook them:

“There are times when I am unable to cook the food that I get in parcels because I only have a kettle and a small air fryer at home. I cannot make a decent meal using the ingredients I get given in them...”—Beneficiary 35

3.1.3.2. Community markets

The ability to choose their own food at community markets allowed beneficiaries to have more autonomy and select foods more in tune with their lifestyle. Cooking classes were conducted twice a week by volunteer chefs who taught beneficiaries how to cook a meal with ingredients available in the market on a particular day:

“I particularly enjoy learning how to cook with what is available in the market on that day... It is helpful that these are free to attend and that the chefs are based within the market on both days...”—Beneficiary 5

3.1.4. Food stability

Shocks such as economic and/or climate crises and cyclical events (seasonal food insecurity) should not risk access to and availability of food (Food Agriculture Organization, 2006).

3.1.4.1. Foodbanks

Stable access to fresh food was identified as a key issue for food stability in foodbanks with increasing food prices leading to reduced donations identified as a key contributory factor:

“I heard from the volunteer team that the amount of donations they receive has been dropping since everything started becoming expensive... it makes sense as ever since this problem, the variety and size of the food parcels has not been consistent.”—Beneficiary 31

3.1.4.2. Community markets

While community markets had a relatively smaller issue related to food, reliable access to fresh food was identified as a key challenge:

“Sometimes it’s a struggle, especially having fresh fruit from here [community market]... however, other types of food are fairly consistently available...”—Beneficiary 3

4. Discussion

While the economic unsustainability of foodbanks and charitable giving is established in prior research, the ability of AFNs to address all four dimensions of food security is seldom explored. The most commonly discussed charitable AFN other than foodbanks is social supermarkets, with most papers evaluating the advantages and efficiency of such enterprises (e.g., Holweg et al., 2010a,b; Klindzic et al., 2016; Wills, 2017) (Table 3).

This research expands the debate and presents data evaluating the effectiveness of two charitable alternative food network (AFN) models, foodbanks and community markets, to address the problem of food insecurity in the UK. It has explored the lived

TABLE 4 Strengths and challenges associated with foodbanks.

	Strengths	Challenges
Food availability	Affordable food: Due to relying on a subscription	Limited food variety: Reduction in amount of food donated has led to a depletion in the quantity and variety of nutritionally balanced food in food parcels. Inconsistent supply: Fruits and vegetables are seldom available in food parcels. Restrictions on frequency of visits: Trussell Trust and Independent foodbanks had varying policies on the number of visits allowed to foodbanks, leading to restriction on beneficiaries' access to emergency food.
Food access	Physical access to free food helps beneficiaries feel less worried about hunger. Partnership with other services: Foodbanks often partner with financial and debt management charities and services, providing clients with additional resources. Building community: Foodbanks add social value as they help beneficiaries meet other people in the same financial situation as themselves, reducing social isolation.	Referral process: The need for a referral from a third-party agency creates barriers for those who are not aware of the referral process or have difficulty accessing referral agencies, thereby, limiting accessibility of foodbanks. Lack of uniformity: Loopholes in the referral process and a lack of uniformity and transparency meant that some beneficiaries accessed more than one foodbank within a local area. Geographic limitations: Beneficiaries who lived in areas without a local foodbank service needed to travel longer distances using public transport or a taxi due to the creation of food deserts. Social stigma: Beneficiaries experience feelings of shame and embarrassment due to the perception that they are unable to provide for themselves and their families, and as they were not afforded the ability to choose food.
Food utilization	Nutritional support: Food parcels distribute a variety of food items, with many foodbanks ensuring a nutritional balance.	Nutritional imbalance: Limited availability of certain food groups and limited access to energy and cooking equipment forces beneficiaries to over-rely on carbohydrates leading to a diet anchored in monotony. Public health: Prepacked parcels has the potential for causing adverse health impacts on beneficiaries with comorbidities.
Food stability	Short-term relief: Stability in the short-term provides many beneficiaries with the assurance that households have access to food and other household essentials during times of crises.	Community resilience: The focus on short-term support fails to address long-term food poverty and build a community resilient to food and financial insecurity. Reduced donations: Donations made to foodbanks are unpredictable due to their dependence on donations.

experience of beneficiaries and placed significant emphasis on giving a voice to a group of individuals whose perspectives are often underrepresented and seldom heard.

Evidence from this study shows that unlike other charitable AFNs such as community markets, beneficiaries of foodbanks felt that the loss of autonomy (i.e., ability to choose their own food and pay for products) led to a loss of dignity—this aligns with findings in other studies (e.g., Pine, 2022; Riol and Robinson, 2022). The findings highlight that while there are clear social and economic benefits associated with both foodbanks and community markets, beneficiaries preferred the community market model as it allowed them to choose an acceptable quantity of good quality and nutritious food at subsidized prices. This was not a possibility at foodbanks where food was largely prepared into parcels by volunteers and handed to beneficiaries—in this model, beneficiaries lacked the complete freedom of choice. While both business models enabled beneficiaries to save money and visit budget supermarkets either to top-up their shopping or purchase other household essentials, the community market model added value by offering lifestyle workshops and a sense of community cohesion.

Beneficiaries benefited from charitable AFNs that provided additional services (e.g., sewing and gardening classes) as for many, it was their primary form of interacting with the wider community. Additionally, it helped improve beneficiaries' mental health and wellbeing. Not all foodbanks provided additional services.

Fresh fruits and vegetables were in high demand in foodbanks and community markets. However, with charitable AFN relying on donations (Byrne and Just, 2022) which are fast depleting due to inflation these were not always available. Clearly, there is a nutritional consequence to this where adequate consumption of fruit and vegetables are fundamental to a healthy balanced diet. Nevertheless, a solution could be the provision of frozen alternatives which offer a rich source of nutrients as they are processed at the peak time of ripeness and nutrient profile. The implication would be for both foodbanks and community markets to invest in the storage ability to accommodate frozen goods.

In practice, rising food insecurity in the UK is one of the contributory factors for the increase in number of referrals made to food banks, notwithstanding they are not a sustainable solution in the long-term (Williams et al., 2016; Iafrazi, 2018). Foodbanks were designed as a short-term solution (Renzaho and Mellor, 2010; Handforth et al., 2013; Middleton et al., 2018) and there needs to be a more resilient solution. One such growth area of re-distribution is observed in app and software development (e.g., “Too Good To Go” and “Donation Genie”). This social media innovation gained momentum during COVID-19, but re-deployment of local food surplus has now become common place within communities, notwithstanding evident geographical differences. Beneficiaries in this study did not mention any apps or software; therefore, it is clearly a nascent model of impact. However, its fundamental

TABLE 5 Strengths and challenges associated with community markets.

	Strengths	Challenges
Food availability	Availability of fruits and vegetables: In addition to other food items and household essential being available, fruits and vegetables were available every week.	Limited stock: Items within community markets are in high-demand due to the subsidized rates. This leads to markets running out of stock quickly, leaving some beneficiaries without access to certain foods.
Food access	Affordability: Food and other household items were sold at subsidized rates. Dignity: Beneficiaries did not feel ostracized or ashamed as they are offered a shopping experience that allows beneficiaries to choose their own food items and other household essentials, which helps restore dignity and a sense of control over their choices. Building community Savings: Subsidized rates of items allows beneficiaries to visit budget supermarkets to purchase items that were not available at the community market, thereby enabling diversity in diet.	Referral process: The need for a referral from a third-party agency for those who are unable to pay subsidized rates coupled with the unawareness of the possibility for a referral among certain beneficiaries resulted in their inability to attend the market during times of financial distress Flexibility: Limited opening hours can make it difficult for beneficiaries with busy and/or conflicting priorities.
Food utilization	Education: Educational programmes in the form of cooking classes that teach beneficiaries how to prepare nutritious meals with the available ingredients improves food utilization. Quality, health and freshness: Availability of fruits and vegetables encourages beneficiaries to consume more nutritious food and make healthier food choices.	Storage and cooking equipment: Lack of appropriate storage facilities and cooking equipment restricts utilization of certain food groups.
Food stability	Long-term relief: Consistent access to affordable and nutritious food contributes to stable access to food and other household essentials.	Reliance on subscription models: Reliance on food from charitable food distribution networks leads to a small degree of unpredictability in the quality of food, despite the utilization of a subscription model.

principle mirrors the community market of procurement, which is a preferred structure by consumers to overcome food insecurity.

4.1. Summary of findings

The strengths and challenges associated with foodbanks and community markets in terms of the food security dimensions are summarized in Tables 4, 5.

It is evident that community markets have the potential to act as a complementary solution to foodbanks to address the multidimensional aspects of food insecurity in the UK. They provide access to nutritious food, fostering healthier diets and nutrition. These markets promote dignity and empowerment by allowing individuals to actively participate and contribute their skills, thereby facilitating community engagement, social support, and knowledge sharing, strengthening community bonds and combating social isolation. Additionally, they contribute to local economic development by supporting local producers and entrepreneurs. Hence, collaboration through partnerships between (national and local) governments, local food aid programmes (e.g., foodbanks and community markets), and local businesses must be encouraged to increase food aid funding, food supply and strengthen support networks.

4.2. Policy implications

It is estimated that 87% of adults living in Great Britain reported an increase in their cost-of-living in Autumn 2022, 96% of whom recorded an increase in the cost of their food shopping with a further 44% reducing their spending on essentials including food

(Office for National Statistics, 2023). A 2022 report by Statista (Clark, 2022) approximated that 2.17 million people in the UK relied on community feeding programmes in 2021/22. This added pressure on charitable AFNs to increase assistance.

With referrals to foodbanks at an all-time high, there must be a policy shift aiming at reducing poverty by for example ensuring that food and energy supply is cheap, reliable, and resilient, supporting education on local growing (including revamping the school curriculum) and creating resilient and transparent labor supply chains to work in the agriculture sector (see Nayak et al., 2022). Findings from this study further highlight the need for a review of Universal Credits as current eligibility criteria do not reflect the impact of the cost-of-living crisis and increasing food prices on households and individuals. This has contributed to food insecurity across the UK with many households at risk of having no access to sufficient food. Additionally, wrong referrals due to a poor understanding of the various charitable organizations and the services they provide contributed to the increase in number of referrals. This calls for mapping the referral process to investigate the challenges faced by agencies and to identify opportunities to improve the process. Clearly, the food bank model is not sustainable, and a new long-term solution needs to be found, from this research community markets could be the answer with targeted investment in infrastructure such as freezers.

One key limitation of the policy implications of the study is the lack of evidence on the impact of one modality of assistance on another (i.e., the effect of the rise in Universal Credit, the UK government welfare benefit programme, on the need for food aid from food aid programmes). Although the UK's benefits system, Universal Credits, was designed to reduce household and individual poverty, the waiting period for the first payment as well as eligibility criteria pushed people into hardship (Thompson et al., 2019).

Further studies are required to assess the potential impact of revising the Universal Credit system on the pressures faced by charitable AFNs in the UK.

5. Conclusion

Food insecurity affects physical and mental health, and social and emotional wellbeing. This study analyses the impact of the cost-of-living crisis on beneficiaries of charitable AFNs in the UK while identifying the opportunities and challenges associated with two business models, foodbanks and community markets. The recent pandemic highlighted the importance of resilient and sustainable supply chains where the role of community cohesion was evident. Although several factors influence food security, a focus on identifying the provision point i.e., the place at which communities access food within their locality has been poorly addressed both in research and policy. Public health benefit emerges through ensuring all consumers including society's most vulnerable have access to food, but further the anxieties and mental health challenges that many experience are alleviated. The notion that foodbanks, as charitable emergency response-based entities, are in a position to offer a food supply that can sustainably meet wider community demand and provide for individual needs, is problematic (Iafrati, 2018). This article suggests the development and support for community markets could provide a more sustainable and appropriate solution allowing for individual dignity and societal cohesion bringing benefit to society by providing mutual support and enabling all to work together for a positive future.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Bournemouth University. The patients/participants

provided their written informed consent to participate in this study.

Author contributions

RN and HH conceptualized the study. RN wrote the first draft of the manuscript. HH contributed to the Discussion and Conclusion section. All authors contributed to manuscript revision, read, and approved the submitted version.

Funding

The authors acknowledge funding support from the Science and Technology Facilities Council Food Network+ and the Bournemouth University Charity Impact Fund.

Acknowledgments

Special thanks are due to the senior leadership team at the community feeding programmes who agreed to include their organizations in the study and help recruit participants, and to the participants of this study for their willingness to take part in the research.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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RECEIVED 17 January 2023

ACCEPTED 30 May 2023

PUBLISHED 16 June 2023

CITATION

Ušča M and Tisenkopfs T (2023) The resilience of short food supply chains during the COVID-19 pandemic: a case study of a direct purchasing network.
Front. Sustain. Food Syst. 7:1146446.
doi: 10.3389/fsufs.2023.1146446

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The resilience of short food supply chains during the COVID-19 pandemic: a case study of a direct purchasing network

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Introduction: The COVID-19 pandemic has presented challenges to global food supply chains. Since the beginning of the pandemic researchers have studied various food supply chain issues influenced by the COVID-19 crisis, including impacts on consumer behavior, and logistical and organizational changes to food supply chains. Despite the proliferation of studies on food supply chains during the pandemic, only a few researchers have focused on short food supply chains and their resilience. Therefore, the aim of this study was to explore the resilience of short food supply chains during the COVID-19 pandemic using a direct purchasing (DP) network as a case study. The study considered three research questions. (1) How has the functioning of the DP network changed during the COVID-19 pandemic? (2) What role do resilience elements (i.e., readiness to shocks, responsiveness to disruption, and recovery from the crisis) play in the short food supply chain response to the COVID-19 crisis? (3) Which innovations in the short food supply chain would further the recovery process, and thus resilience, after the crisis?

Methods: This article presents a case study of a direct organic food purchasing network in Latvia. The analysis of economic data regarding the dynamics of organic product demand and supply in the DP network was supplemented with an analysis of qualitative data gathered through semi-structured in-depth interviews with representatives of three groups of DP network participants: consumers, producers, and DP network organizers.

Results and discussion: From the consumer and producer experiences, the DP network was a flexible short food chain that could adapt quickly in a crisis. While the number of DP distribution points and total number of purchases decreased during the pandemic, a statistically significant increase in the number of product units sold compared to the pre-COVID-19 period was observed. From the perspective of food chain resilience elements, the reactive strategies of the DP network as a short food supply chain were highlighted. During the COVID-19 pandemic, the organizational and product innovations introduced in the DP network played a key role in enhancing the resilience of the short supply chain in the context of the wider food system.

KEYWORDS

short food supply chains, COVID-19 pandemic, direct purchasing, organic food, organic farmers, food network, resilience, Latvia

Introduction

The COVID-19 pandemic has strongly influenced and changed the way food supply chains work. In many countries measures to control COVID-19 outbreaks have affected food supply chains (United Nations, 2020) at various food production stages (Galanakis, 2020). Many of the effects of the COVID-19 pandemic on food supply chains were due to restrictions on people's mobility and labor shortages that influenced food production and the harvesting of crops (Coluccia et al., 2021), as well as deliveries (Hobbs, 2020). The COVID-19 pandemic was also characterized by a shift in customer preferences (Butu et al., 2020) and food purchase behaviors from food service to food retail (Coopmans et al., 2021). Many restaurants and cafes were closed, forcing people to prepare more food at home. As a result, food chain actors had to adopt new distribution and logistics strategies (Marusak et al., 2021), implement technologies for placing online orders (Butu et al., 2020), and introduce automation and digitalization into food supply chains (Hobbs, 2021). Thus, the COVID-19 pandemic exposed vulnerabilities in markets and systems (Migliore et al., 2021; Rivera-Ferre et al., 2021) but also encouraged discussions about the resilience and flexibility of food supply chains (Coopmans et al., 2021; Ozdemir et al., 2022). Thus, the COVID-19 pandemic as a worldwide real life crisis depicted the fragility of the global food systems and the fact, that they can be disrupted easily (Béné, 2020). Therefore, during the COVID-19 pandemic, the role of short food chains as well as local and regional food production was reconsidered (Cappelli and Cini, 2020). Researchers consider less globalized food systems to be less vulnerable compared to global food systems (Rivera-Ferre et al., 2021) and the ability of short and regional food supply chains to respond more adeptly to the changes and demands imposed by the COVID-19 pandemic has been highlighted (Marusak et al., 2021; Thilmany et al., 2021), but the resilience of short food supply chains during COVID-19 pandemic remains largely unexplored (Michel-villarreal et al., 2021). Thus, this research aims to strengthen the knowledge about the resilience of short food supply chains specifically during the COVID-19 pandemic by exploring the ways specific short food supply chain actors responded and adapted to the global challenge of the COVID-19 pandemic. The results of the research are based on a practical, real-life crises experience thus strengthening the lacking evidence of what contributes to the resilience of food chains (Coopmans et al., 2021).

Although various researchers have conceptualized supply chain resilience in different ways, previous research has placed an emphasis on the elements of responsiveness, readiness, and recovery (Chowdhury and Quaddus, 2016; Han et al., 2020; Ali et al., 2022). There is still an inconsistency regarding which of these elements are crucial for dealing with the COVID-19 pandemic (Ali et al., 2022). Measuring the abilities of food systems to absorb and recover from disruptions provides a valuable insight into their areas of strength and weakness, and can assist in directing future planning and efforts accordingly (Golan et al., 2020). Simultaneously, as local food supply chains are not automatically more sustainable and resilient than global ones (Brunori et al., 2016), in this research we have focused on short food supply chains specifically. The resilience of food chains depends on the context

and particular resilience aspects, therefore this article examines the processes of adaptation and transformation of short chains in crisis situation.

In this study, we have analyzed food chain resilience using the three elements of responsiveness, readiness, and recovery. The resilience of short food supply chains during the COVID-19 pandemic was explored using a direct purchasing (DP) network as a case study. The study considered three research questions. (1) How did the functioning of the DP network change during the COVID-19 pandemic? (2) What role did the resilience elements (i.e., readiness to shocks, responsiveness to disruption, and recovery from the crisis) play in the short food supply chain response to the COVID-19 crisis? (3) Which innovations in the short food supply chain can further the recovery process, and thus resilience, after the crisis?

The research addresses the knowledge gap resulting from the lack of studies on short food supply chain resilience during the COVID-19 pandemic as well as the responses of these chains after the pandemic. The findings will improve our understanding of the resilience of short food supply chains during the COVID-19 pandemic and specifically the role of the elements of responsiveness, readiness, and recovery as well as provide an insight into how they are manifested practically in short food supply chains and their resilience.

Conceptual approach

In this section, we first define the conceptual approach regarding short food supply chains and then focus on the resilience of food chains.

Short food supply chains

The significance of short food chains has been stressed not only in the context of the COVID-19 pandemic but has also been discussed at the European Union (EU) level. The need for more sustainable food systems is recognized by the EU (European Commission, 2020) and short food supply chains can be viewed as a form of sustainable supply chain (Paciarotti and Torregiani, 2021).

In this study, short food supply chains were defined by referring to three types of proximity: (1) physical distance, i.e., the closeness of farmers (producers) to consumers; (2) organizational distance, i.e., the number of intermediaries in the chain; and (3) social distance, i.e., the relationship between farmers and consumers (Malak-Rawlikowska et al., 2019).

A short physical distance means that the distance between the point of production and consumption is shorter than in multi-actor food supply chains (Kiss et al., 2019). When referring to short food supply chains, the defined physical distance usually varies from 30 to 100 km, but can be longer, e.g., 160 km in the UK and 250 km in Sweden (Paciarotti and Torregiani, 2021). A short physical distance in food chains is also closely connected to the locality of food (Chang et al., 2022), food freshness and a shorter shelf-life (Kiss et al., 2019), as well as the seasonality of the products (Doernberg et al., 2022).

Organizational distance in short food supply chains refers to a reduction in the number of intermediaries between farmers and consumers (Jarzebowski et al., 2020), which could be just one or even none (Galli and Brunori, 2013; Malak-Rawlikowska et al., 2019). A reduction in both physical and organizational distance can improve the economic situation of farmers by increasing their earnings (Kiss et al., 2019). When referring to the proximity of organizational distance, it is crucial that not only the number of intermediaries should be taken into account, but also the diffusion of relevant information (González-Azcárate et al., 2021), e.g., details about the products and farming methods. Previous studies have shown that one of the most important benefits of short food supply chains is the possibility of obtaining information about the products (Vittersø et al., 2019), which is also closely connected to the proximity of social distance. Social proximity refers to the communication and relationship between farmers and consumers, which involves trust and familiarity between individuals (Dubois, 2018), thus allowing feedback to be given and received regarding aspects of food quality as well as ethical and social values (Galli and Brunori, 2013).

The specific types of short food supply chains range from farmers' markets, roadside sales, and home deliveries to cooperative shops and solidarity groups (Tiganis et al., 2023). Specific initiatives and their significance vary from country to country in the EU, e.g., in Sweden, a crucial role is played by REKO rings, which is a network of local food markets that connects local food producers and consumers (Fuentes and Fuentes, 2022); in Italy, solidarity-based purchase groups (GAS) have gained popularity, which are self-organized consumer groups that have direct relationships with farmers (Chiffolleau et al., 2019); while in France, since late 2000 (Lamine et al., 2019) a participatory food system (AMAP) has developed, in which small-scale farming and direct links between farmers and consumers are promoted (Chiffolleau et al., 2019; Medici et al., 2021).

Resilience of food supply chains during the COVID-19 pandemic

Since the 2000s, when the concept of resilience was introduced to supply chains (Ozdemir et al., 2022), it has been widely used in food chain research to describe the ability of food systems to withstand and recover from internal or external disturbances or shocks (Grigorescu et al., 2022), e.g., natural disasters (Singh et al., 2021), geopolitical instability (Hendry et al., 2019), or pandemics. Thus, resilience pertains to the ability of systems to manage unfavorable situations without having long-term negative effects on their overall wellbeing or functionality (Béné, 2020; Ozdemir et al., 2022). To achieve resilience, the ability of food supply chains to respond to shocks is crucial (Ali et al., 2022). During the pre-COVID period, studies of food system resilience focused on a specific disruption scenario (Golan et al., 2020), but Hooks et al. (2017) reported that the true measure of resilience can only be assessed during times of crisis. Thus, the COVID-19 pandemic, as a specific crisis, severely impacted the resilience of many food systems and at the same time presented an opportunity

to identify and verify key aspects and factors that contributed to their resilience (Alam et al., 2023).

In recent years, especially since the COVID-19 pandemic started, food chain resilience has been conceptualized in different ways. In this research, we applied a concept in which the resilience of food systems consisted of three elements: readiness, responsiveness, and recovery (Chowdhury and Quaddus, 2016; Han et al., 2020; Ali et al., 2022). Readiness refers to the preparation and planning that is necessary to respond effectively to disruptions (Han et al., 2020), thus enabling a quick reaction in times of crisis (Kazancoglu et al., 2021). Readiness is often connected to proactive actions (Ali et al., 2022). Responsiveness refers to the ability of the food supply chain to quickly identify and respond to disruptions and consumer demand (Azaron et al., 2020; Chiffolleau et al., 2020; Kazancoglu et al., 2021). During the COVID-19 pandemic, it was observed that responsiveness, as a resilience element, was not a characteristic of all food systems (Kazancoglu et al., 2022).

Recovery refers to the process of restoring the food supply chain to its original, or even a better-adapted, state following a disruption (Chowdhury et al., 2021). A capacity for recovery allows the focus to be on the continuation of operations as well as the minimization of long-term effects (Ali et al., 2022). The rapid introduction of innovations could also help organizations cope with a crisis (Galanakis, 2020), thus strengthening the ability of food systems to recover (Rowan and Galanakis, 2020).

Previous studies have stated that supply chains need to have a specific level of readiness in the pre-disruption phase in order to reduce the effects of the disruptive event. Simultaneously, supply chains need to have the ability to respond and recover to reduce the impact of the disruptive event (Ponomarov and Holcomb, 2009; Chowdhury and Quaddus, 2016). Various researchers have concluded that a holistic approach to the analyses of all three resilience elements, i.e., responsiveness, readiness, and recovery, should be adopted in food supply chains (Chowdhury and Quaddus, 2016; Ali et al., 2022).

Methodology

In this section, we define the research object, i.e., the DP network, and the main analytical categories, and also present the methods used for data collection and analysis.

Methodological approach: the case study

This study was based on the evaluation of a short food supply chain, a DP network, using an embedded case study and a mixed-method approach. The main research object, a specific DP network with clear boundaries, was selected as a case study because all the DP distribution points¹ and farms involved in the network had common historical, political, economic, and social conditions of origin and evolution.

1 Place (usually a room in an office, community centre, private garage, or basement), to which farmers bring the ordered products at the pre-arranged time and the consumers, congregating at the specific spot, gather the products they have ordered.

The case study had three research stages. During the first stage, an investigation of the historical evolution of the DP network was conducted, including a brief socio-technical description and key milestones in its evolution up to the onset of the COVID-19 pandemic and then during the crisis. During the second stage of the research, economic data regarding organic product demand was obtained through the DP network online system and then analyzed for the periods before and during the COVID-19 pandemic. The third stage of the research included a qualitative investigation of the DP network, including interviews with the DP network actors, farm visits, and participant observations, while the researchers also participated in the operation of one of the DP network distribution points in Riga.

Research object: the DP network

The research object, i.e., the DP network in Latvia, is a specific network of organic farms and product distribution points and includes three main groups of actors: organic farmers, consumers, and DP distribution point organizers. The DP network has clear boundaries, which are defined by the commonly used online product ordering system. The distribution points and organic farms using the specific product ordering system participate in the DP network. At the beginning of 2020, there were 88 organic farms and 18 product distribution points, situated mainly in the towns and cities involved in the DP network, 11 of which were situated in the capital of Latvia, Riga, with another seven in small towns in central Latvia.

The DP network is a self-managing system. Through an online ordering system, consumers can order products from organic farms once a week, and on a pre-arranged day and time they collect and pay for them at one of the DP distribution points. During this process, all consumers are directly involved in the different stages of selling–buying activity in the network. The consumers are responsible for receiving products from farmers, and then sorting and distributing them. Once every 6–8 weeks, each consumer has to participate in the process. All consumers can buy fresh, local, organic food for a reasonable price, but they have to dedicate a few hours of their time as a volunteer in the DP network every few weeks.

Main analytical categories of the research

During the research, various analyses were conducted based on the research questions and literature review. These included determinations of the following.

- The dynamics of the DP network before and during the pandemic.
- The resilience elements of the DP network during the COVID-19 pandemic.
- Innovations in the DP network during the COVID-19 pandemic, and their role in the recovery of the DP network.

The dynamics of the DP network before and during the pandemic were analyzed to determine if the specific network

withstood the disruptions of the COVID-19 pandemic. By investigating the specific resilience elements it was possible to understand how the network responded to the specific disruption and the role of each element in the recovery of the DP network. Specific attention was given to the aspects of innovation in the DP network because they could further the recovery of the network after the disruption.

Data collection and analyses

A mixed methods approach was adopted in the study. Quantitative data were gathered through the online DP ordering system, which retained information about all the purchases made through the network. Quantitative data were obtained from the online system developer and maintainer, with a specific agreement reached regarding the purpose and conditions of the data use. Data from the 2018–2021 four-year period were used, i.e., including data from the period before and during the COVID-19 pandemic. The data collected included the number of DP distribution points and product orders, weekly product demand (product units sold, i.e., liters or kilograms depending on the type of product), and all purchases made during this period. Data from 2018 and 2019 were used to analyze the dynamics of the DP network before the COVID-19 pandemic, while data from 2020 to 2021 were compared to that from 2019 to identify any new tendencies during the COVID-19 pandemic. Data, gathered from the online DP ordering system, were spatially analyzed and depicted by employing a geographical information system (GIS) approach using the ArcGIS Pro software.

To assess whether the changes in the DP network regarding the number of DP distribution spots, purchases done in the DP network as well as the number of sold products might be related to the COVID-19 pandemic, we compared the average values between two groups—the pre-COVID-19 pandemic period (March 2019–February 2020) and during the COVID-19 pandemic (March 2020–February 2021). The difference between the groups was measured with Student's *t*-test.

To match the information gathered quantitatively and to obtain a deeper understanding of the values and attitudes of the participants involved in the DP network, qualitative data were collected. Data were obtained through in-depth interviews and supported with material from visits to farms and observations made during the author's participation in the DP network at one of the distribution points in Riga. The sample of interviewees included three groups: DP farmers, DP consumers, and DP organizers. A total of 16 in-depth interviews were conducted during March–May 2022, of which six interviews were carried out with DP farmers, six were with DP consumers, and four were with DP organizers, who were at the same time also DP consumers.

Four interviews with DP farmers were conducted at their farms, one was conducted in Riga when the farmer delivered products to the DP distribution points, and one was conducted online due to COVID-19 safety considerations. The interviewed farmers were stratified by three categories: regularity of involvement in DP networks (all farms were delivering their products to DP network points at least once a month), the farm profile (three farms were producing specialized produce, while three were multi-functional),

and geography (the farms were from different regions of Latvia, i.e., Kurzeme, Latgale, and Vidzeme). Five interviews were conducted with one representative of the farm, while in one case both farm owners (husband and wife) took part in the interview.

The interviews with DP consumers and DP organizers were conducted in the participants' living spaces, workplaces, or at DP network points. The interviews with DP consumers were stratified by three categories that were customized to the characteristics of the whole DP network: duration of involvement in the DP network (from 3 months to 10 years in the DP network), geography (five participants/organizers from DP network points in Riga, and five from DP network points outside Riga), and family and household composition (eight families with young or teenage children, one family without children, and one family with a grown-up child). The interviews with DP organizers included interviews with both the person who established the DP movement in Latvia in 2008, as well as the managers of specific DP distribution points.

For each group of interviewees, the questions were prepared and grouped under three sections: DP trends (of food purchasing practices) during the COVID-19 pandemic, drivers of change during the COVID-19 pandemic, and future innovations and long-term changes/recovery in the DP network during the COVID-19 pandemic. The interviews were 25–70 min long. All interviews were recorded and later transcribed.

The transcribed interviews were reviewed and coded based on the trends and changes in the DP network during the COVID-19 pandemic and innovations in the network during the COVID-19 pandemic. Cross-interview codes were identified during a process of inductive coding. The codes of responsiveness, readiness, and recovery were then introduced and were modified and restructured as further themes emerged.

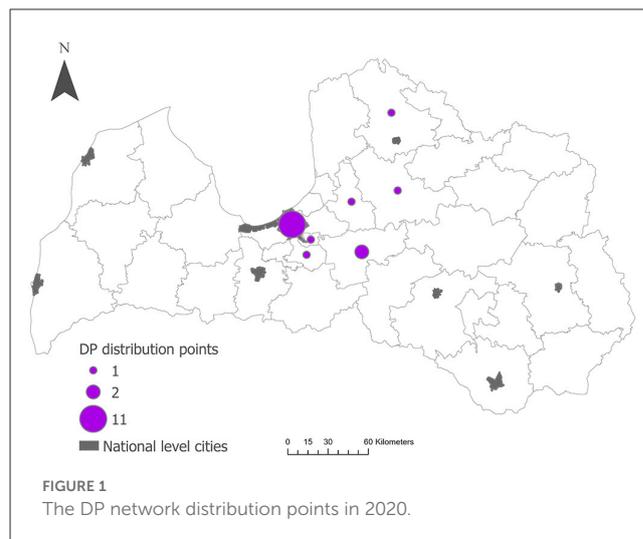
The results obtained from the farm interviews and observations made during the author's participation in the DP network at one of the distribution points in Riga helped to establish a close relationship with the actors of the DP network. This strengthened the mutual trust between the researcher and interviewees and enabled the interviews to be conducted productively. The results obtained during the farm visits and observations were used to deeply understand the attitudes of respondents.

Results

In this section, we describe the historical development of the DP network as a short food supply chain and present our findings regarding the dynamics of the network before and during the COVID-19 pandemic in the context of food supply chain resilience i.e., its potential for responsiveness, readiness, and recovery.

The DP network as a short food supply chain: historical development and key milestones

The DP network was established in 2008 as an initiative of a young family who intended to acquire fresh, organic, local food for themselves and later for their friends. Organic food was a novelty in

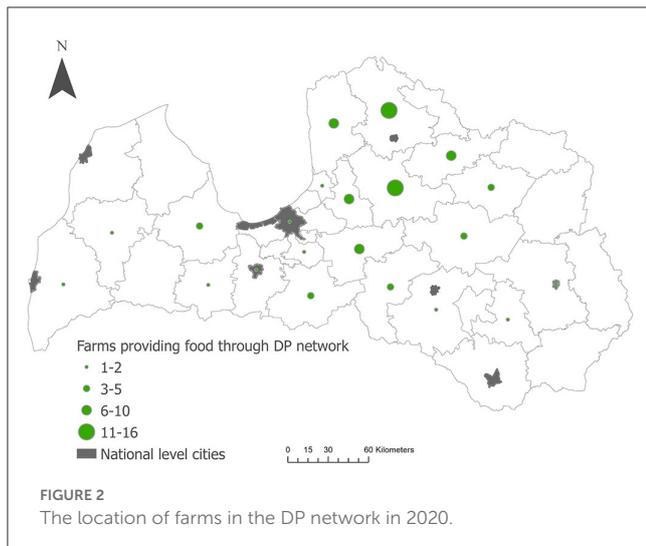


Latvia at that time, with organic agriculture in Latvia only starting to grow rapidly after Latvia acceded to the EU in 2004 (Pawlewicz et al., 2020). The number of farms practicing organic agriculture continued to grow through to 2007 (Melece, 2010). The first organic farmers' market initiative was developed in the capital city of Latvia in the early 2000s (Šumane, 2010), but even by 2008, organic products were not easily accessible to consumers. Therefore, the DP developers started to look for alternative ways to buy local organic products. The DP network started as a small-scale collaboration between one family and a few organic farmers, developing into a fully functioning food provisioning network with organic farms, consumers, and distribution points (Bankovska, 2020).

After the establishment of the first distribution point in Riga, the DP network developed rapidly and new distribution points opened in other parts of the city and in other towns in Latvia. In all cases, there were a few key people, or even just one, who led the process, identified a location for the distribution point, attracted new consumers, and negotiated with farmers. Initially, the orders to farms were made by directly calling the farms, loading the orders into "Excel" files, and forwarding them to the farms. As the network grew, the ordering process using "Excel" files became inconvenient and mistakes often occurred as orders became more complex. Thus, a turning point was reached and an online product ordering system was developed in 2014, which is still being used by all consumers and farms involved in the DP network.

The main actors in the DP network were the organic farmers and consumers. It was intended for this network to function as a self-organizing system, but there was usually one "organizer" of each DP distribution point who accepted new members into the network. There are about 20–40 consumers involved in each distribution point, buying food for their family (four persons on average).

The network provided consumers with the opportunity to buy seasonal, organic, local food. At the beginning of 2020, 88 organic farms were participating in the DP network (Figure 1). These farms delivered products at least twice a year to 18 product distribution points (Figure 2), 11 of which were situated in Riga and other smaller towns concentrated in the middle–northern part of Latvia.



Most of the farms were located 30–120 km distance from their main markets, i.e., the DP distribution points, while there were also a few farmers traveling up to 240 km to the DP distribution points in Riga.

The product categories offered by the farms included greens and vegetables, dairy products, meat and eggs, cereal products, and processed and ready-to-eat products. The variety of products offered expanded over time. Within the DP network, there were both specialized farms, offering specific products (e.g., eggs or dairy products), and multifunctional farms, offering a wide range of products (vegetables, eggs, and meat). Some farms also offered processed products.

Most consumers in the DP network were women aged 25–45 years. They were mainly educated and knowledgeable, married with one to three children, and had an average or below-average income (Bankovska, 2020). The consumers purchased products for the whole family. The interviewed consumers and DP organizers purchased 20–90% (mainly 40–50%) of all the food their families consumed through the DP network.

The farmers delivered their produce directly to the distribution points, with no intermediaries between the farmers and consumers in the DP network. However, there was still a need for paid labor or volunteering to enable the network to function. Thus, the self-organization of the network was achieved through volunteering. Volunteering occurred only on the consumer side of the system, with volunteers taking part in the distribution of the products at the DP network distribution points. For the network to function, volunteering had to be accepted and supported by the consumers.

The DP network was also characterized by direct contact and communication between farmers and consumers. The DP network organizers and consumers reported a feeling of community due to the DP network and social interaction was a crucial aspect of the DP network for them. In the interviews, respondents admitted that direct contact with the farmers was crucial and had changed their attitude toward the products and their value. Seeing how the produce was grown and hearing directly from the farmers about the difficulties they had to overcome during this process contributed

to the consumers' appreciation of the back story of food and led to them treating food with more respect: "About twice a year a wonderful part of this process [DP] is that you drive to the farm, that in the summer you can organize those drives (...) I have been a lot – two, three years ago. And it's the kind of experience that changes [product] ordering afterwards because somehow... you've seen the person and you know their story, when it's... that's the wonderful thing about that direct purchase that you know the ones [farmers]... yes, the one in that direct contact... it makes a big difference, it does. Then that product has another value – you see that face, you know that job, you know that story, and the problems they [farmers] often have...". Direct contact in the DP network was appreciated not only by consumers but also by farmers: "Then, in the direct purchase, I like this particular contact with a person (...) they call me and tell me: 'Your tomato juice is such that you feel like you are drinking tomatoes'. Balm for the soul..".

Purchasing dynamics in the DP network during the COVID-19 pandemic

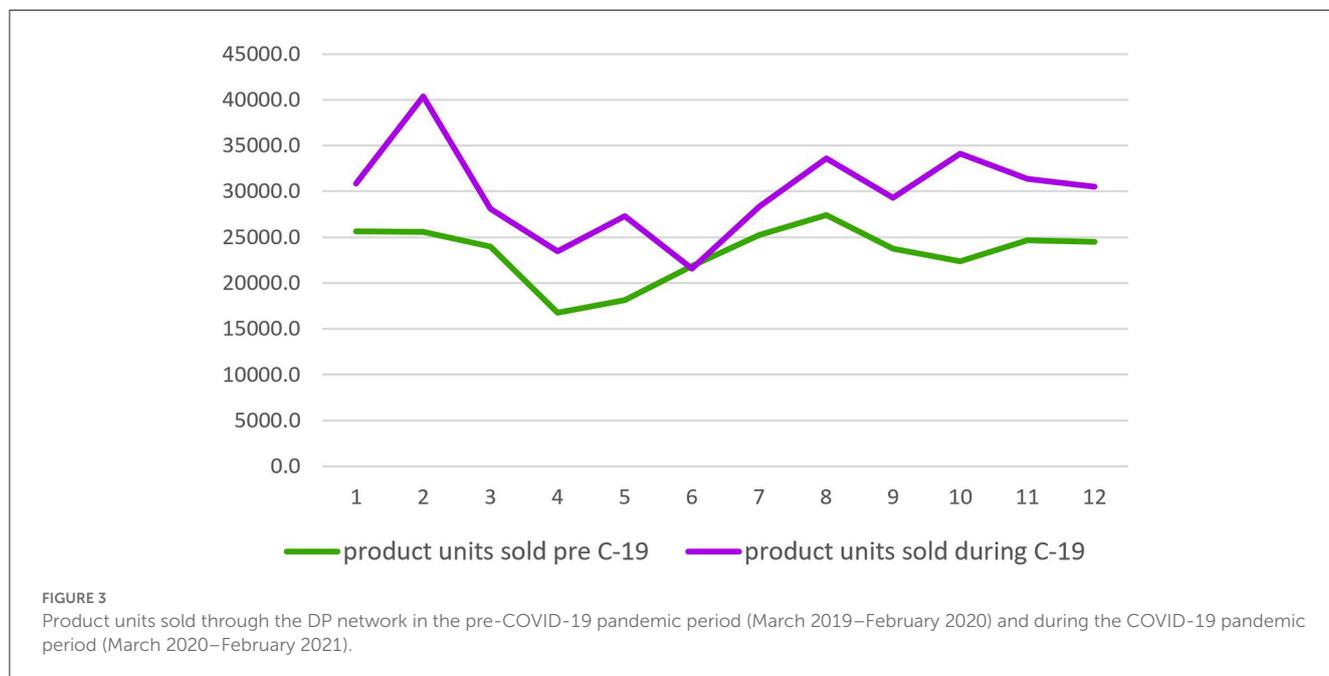
Up until the beginning of the COVID-19 pandemic, the development of the DP network had stabilized, with the number of DP distribution points, consumers at each location, and the product units purchased each week/month tending to decrease by a few percent on average per year.

The trends in the number of product units sold tended to recur from year to year and were characterized by a decrease in spring and summer and an increase in autumn. In summer, more fresh products, including greens and vegetables, were available on farms, but at the same time, consumers from the cities tended to travel to the countryside or spend vacations abroad and therefore did not buy as much food through the DP network. In autumn, they returned to the cities, children returned to school, and a variety of vegetables were harvested, therefore September was the month when the number of product units sold through the DP network was highest. Another characteristic of the DP network was an increase in trading through the DP network before holidays, e.g., Christmas and Easter, and then a decrease in the following week. These tendencies changed as soon as the COVID-19 pandemic began.

At the beginning of the COVID-19 pandemic restrictions were introduced in Latvia that included strong containment measures (e.g., school closures and border controls), which lasted from 13 March to 9 June 2020 (Webb et al., 2022). The product purchasing habits through the DP network changed during this time. The total number of purchases done through the DP network compared to the same period in the previous year decreased (Table 1), whereas immediately after the COVID-19 pandemic started the total product units sold increased rapidly compared to the pre-COVID-19 period (Figure 3). The DP network economic data for the later period during the COVID-19 pandemic was characterized by ups and downs (Figure 3), which was a consequence of both the product availability from farms and the COVID-19 restrictions during the summer 2020 and 2021 being loosened in Latvia, whereas at the end of October 2020,

TABLE 1 Trends in the DP network in the pre-COVID-19 (March 2019–February 2020) and during COVID-19 (March 2020–February 2021) period.

	Pre-COVID-19 pandemic (n = 12)	During COVID-19 pandemic (n = 12)	P-value
DP distribution points	18.	17.8	0.0001
Purchases made in the DP network per month	443.9	416.3	0.0021
Product units sold through the DP network per month	23,321.6	29,905.9	0.1911



they became much stricter. The total number of DP network distribution points also decreased during the COVID-19 pandemic (Table 1).

The changes in the DP network between the pre-COVID-19 and during the COVID-19 periods in terms of purchases made and product units sold were statistically significant, while the data did not show statistical significance in the changes in the number of distribution spots (Table 1).

The rapid increase in the product units sold just after the beginning of the COVID-19 pandemic, i.e., during the first wave of COVID-19, was confirmed by all interviewed farmers and most of the interviewed consumers (Table 2). Farmers mentioned overloaded transport vehicles due to the high product demand, very long hours of work, and the need for additional manpower at the beginning of the COVID-19 pandemic: “As soon as it [COVID-19 pandemic] started, a terrible panic arose, there were terrible, extremely large orders. Let’s say that for me, it was positive it was even very positive that many people didn’t go to the stores and... And the very first spring [of the pandemic] (...) generally such unrealistic orders – my husband asked me how should I put it all in the car?”. The increase in product units sold through the DP network is closely connected to the aspects mentioned in the interviews regarding the switching from grocery stores to the DP network due to the restrictions, more demand, and supply of easy-to-prepare products as well as the introduction of new products in the DP network.

The period of the COVID-19 pandemic in the DP network was characterized not only by changes in food purchasing trends but also by changes in social interaction between the actors in the DP network that was mentioned by most of the interviewed consumers of the DP network (Table 2). The change in social interaction in the DP network included a reduction in direct contact and communication, less frequent common events, and a shift from direct to online communication channels. During the pre-pandemic period, specific activities took place at each DP network distribution point (e.g., meetings, events, farm visits, or working on farms). During the pandemic, these activities were reduced due to the restrictions. This had a direct impact on communication, the feeling of community, and friendship: “This means that we will no longer communicate so much individually with the farms (...) I think that the cherry on top of the DP is that there is also direct communication. I, on the one hand, don’t want to lose it, that direct communication disappears. And it seems to me that...that’s exactly the power that DP has(...) I think this is such an important aspect”.

As it was mentioned in Section 4.1—most consumers in the DP network are women, purchasing food for the whole family. During the COVID-19 pandemic food provisioning and family practices changed with more men becoming involved in the process. This happened due to both the restrictions (the volunteers were not allowed to work together with their usual colleagues from other households, therefore members from one household did the work

TABLE 2 Perceived effects of the COVID-19 pandemic on the DP network.

Themes	Consumers (n = 10), %	Producers (n = 6), %
Food purchasing habits		
Buying more food through DP	40	100
Switching from grocery stores to DP network	30	17
More demand for an easy-to-prepare product	20	33
More family members involved in the food purchasing/the DP network	20	0
Social interaction in the DP network		
Reduction of direct social interaction	90	50
Shifting from direct to online communication	40	0
Less frequent common events	30	0
Innovations in the DP network		
Introduction of digital payments	80	33
New products	10	33

of volunteers) and the weight of the increasingly large orders: *“It’s really interesting to see how they [men] come after the orders, then they look up and wonder what it is. They very often are... used as a transport. They are the ones coming to take the products. Then they wonder what it is... don’t understand what it is that they [their wives] have ordered there. Well, so they examine those jars. But the decision-makers are women”*. Thus, the men were more often involved in the food provisioning practices in the DP network during COVID-19. Simultaneously, their involvement was more technical and the women were still the main food provisioning planners, taking the main responsibility in the family of this process.

Resilience of the DP network during the COVID-19 pandemic

Several aspects of the DP network that were manifested as resilience during the COVID-19 pandemic directly affected the network and its functioning. They were also closely connected to the response of the network to the COVID-19 pandemic as well as its recovery.

Readiness to shocks

The period of the COVID-19 pandemic was characterized by waves of strict and looser restrictions that controlled social interaction not only between adults but also between children. There were periods in the spring and autumn of 2020 when schools switched to distance learning and many places of work also converted to remote working. These periods were characterized by new daily routines when food supply and preparation switched completely to individual homes. Because cafes and restaurants were

closed and school catering was not available, the only option was to order ready-made food or to prepare meals at home. Thus, more produce was needed at home to prepare food for the family several times a day, which also affected the product units sold through the network.

During the COVID-19 pandemic varying degrees of restrictions applied to store visits: the number of customers at any one time was limited, a minimum number of square meters per person was determined, and later only individuals who had recovered from or were vaccinated against COVID-19 were allowed into shops. These restrictions motivated consumers to change their shopping habits. People did not visit grocery stores as often but rather obtained more food through the DP network. These changes were feasible due to the readiness of the DP network to react quickly at the beginning of the COVID-19 pandemic.

During this period, the readiness of the DP network was manifested through the actions implemented before the COVID-19 pandemic. Several practical measures, such as the development of the online product ordering system, enhanced the readiness of the network, as well as the emotional attachment to the network that had developed over time. This system was developed and implemented to facilitate the product ordering process, thus benefitting farmers and consumers. As soon as the COVID-19 pandemic started, this system allowed products to be ordered remotely, thus the direct contact restrictions during the COVID-19 period did not affect sales.

Another practical measure taken by the DP network that enhanced its readiness for the pandemic shock was the digitalization of payments. The introduction of digital payments was possible due to the proactive actions of farmers and consumers regarding digital payments in other areas of their lives. Before the COVID-19 pandemic, most payments to farmers for products sold through the DP network were made in cash. The interviewed consumers and organizers revealed that after the start of the COVID-19 pandemic, their distribution location had digitalized the payment system and had started to accept payments and make payments to the farms via electronic bank transfers. This restricted social interaction and avoided the inconveniences of operating with cash. One distribution point organizer commented that: *“People come in the evening, and then there are those situations that there is no change to give and it’s evening, and absolutely everything is closed – the pharmacy is closed, the shops are closed, and then they run and try [to split up a large banknote]. And then someone has forgotten [to withdraw cash], then he runs to the ATM, and there is always such a mess... Therefore, from this point of view, it is much easier to pay by bank transfer”*.

Readiness was also manifested through the customers’ emotional attachment to the DP network. Several consumers referred to the role of the pre-COVID-19 pandemic period interaction with farmers, and the feeling of care toward them and reliance on them as trusted food providers. Thus, they continued to buy products through the DP network and did not switch to the remote delivery of food from supermarkets. Consumers and DP organizers reported that they took care of and felt responsible for the farmers. During the COVID-19 pandemic the feeling of reciprocal care even intensified, according to interviewees: *“Again, to a certain extent, I also care about that farmer that... I even*

sometimes wonder, but you feel like the ‘Little Prince’, that you have tamed something, that you feel a bit responsible, that you are there with your consumption and somehow ensure the cash flow, because those people [farmers], they are already counting on you [your order]”. A reliance on farmers was apparent when consumers discussed the unpredictability and fear at the beginning of the COVID-19 pandemic. The customers of the DP network admitted they were aware of the farmers’ difficulties due to the pandemic restrictions, and they wanted to show solidarity. This awareness enhanced trust in the DP network as a secure and reliable food supply under the specific circumstances: “No matter what happens, the family will be fed, even if they don’t allow us in the supermarket, even if everything is locked, there will always be the DP network, because the farmers are milking the cows, regardless of the day, date or world events. The cow is milked, the bread is baked, and the vegetables are grown. And this awareness somehow helped to maintain a sense of unity, a sense of security [during the COVID-19 pandemic]”. Other customers stated that they felt a large sense of responsibility toward farmers as food providers. Therefore, they continued to buy products in the DP network during the COVID-19 pandemic, despite limits on social interactions and other restrictions: “Sometimes it happens that I feel exhausted and it seems that we still have some food, we might not order more this time, but there is some kind of responsibility toward the farmer and then I think – he is planning, how many carrots he has to grow/will grow, he is planning how many potatoes he will grow or how much milk he will process this week”.

Responsiveness to disruption

Responsiveness in the DP network was manifested through the quick response to changing trade regulations and consumer food acquisition conditions. As soon as COVID-19 restrictions were introduced, new internal rules were developed at most DP distribution points. Once the COVID-19 pandemic started, a warning about responsible handling of food products due to COVID-19 restrictions was placed on the DP product ordering platform. The actual interpretation and implementation of the COVID-19 pandemic trade rules were the responsibility of each DP product distribution point itself. Many of the interviewed DP consumers as well as the organizers confirmed that their DP distribution points developed a product distribution system that was more precise in terms of product collection time. Before the COVID-19 pandemic, consumers could visit the distribution point at a time of their choosing within a predetermined 2- or 3-h (depending on the distribution point) interval, but once the COVID-19 pandemic started at many DP distribution points every customer received a specific time at which they could collect their products. Usually, time slots with 7-min intervals were predetermined: “A schedule for receiving products was created. It seems to me that everyone has their slot that is calculated from the number of orders for that day, for each one approximately seven minutes, I think”.

In several DP distribution points a contactless product receipt was introduced. This enabled farmers to bring products to the entrance of the DP distribution point and leave them outside the door. A volunteer then brought the products inside, sorted

them by order, and based on the list of specific products and their collection time for each customer, placed the orders outside. Thus, a process of contactless product receipt and distribution was established. This process operated only while the restrictions were in force.

During the COVID-19 pandemic, many of the interviewed customers indicated that they had made changes in their daily meal preparation habits at the household level due to remote learning and working conditions. This, in turn, affected their food acquisition practices through the DP network, with an increase in the demand for easy-to-prepare products. Farms responded quickly and offered different ready-to-cook or ready-to-eat products, such as peeled and sliced vegetables or ready-made salad.

Another aspect of responsiveness was an increased demand for immunity-boosting products. New vitamin-rich products were rapidly developed by the farmers (e.g., fresh juices) and offered through the DP network, while similar products that were available before the COVID-19 pandemic were purchased more often than before: “I noticed that (...) products appeared to strengthen immunity, such as fruit and berry juices. New products were created, e.g., from cranberries or garlic”. The growing importance of healthy products during the COVID-19 pandemic was also confirmed by the interviewed farmers, who, as a result, expanded their offerings of this kind of produce.

Recovery from the crisis

The pandemic was an ongoing crisis for more than 2 years. The recovery of the DP network was also an ongoing process that started just after the first wave of the pandemic and continued for some time in response to the new challenges brought by the intermittent waves of COVID-19 infections. The elements of recovery during this period were associated with changes in the DP network management, operational practices, the relationships between consumers and producers in terms of increased social proximity, and the introduction of digital marketing tools and solutions in the network.

The rapid growth in the number of products sold in the network during the first wave of the pandemic stopped after the restrictions were loosened and the number of purchases became similar to that during the pre-pandemic period. There was still a small increase in the number of products sold that could be attributed to the product innovations introduced in the DP network.

Opportunities for personal interaction between farmers and consumers decreased due to COVID-19 restrictions and the establishment of contactless product distribution. The usual face-to-face socialization in the DP network was partly substituted by online social events and connections. Some distribution points developed online communication groups in social networks (e.g., WhatsApp, Facebook) that were used to discuss news related to restrictions and product ordering systems. As the restrictions were lifted, some of the DP distribution points abandoned the principle of a specific time slot for product distribution. Some DP distribution points continued this practice because it was found to be more convenient for volunteers and was a more time-effective way to operate. However, this practice has restricted opportunities for consumer interaction.

The introduction of digital payments proved to be an effective form of operation in most DP distribution points, with only one returning to payment by cash. In most DP distribution points electronic money transfer was found to be a much better payment method than cash, as acknowledged by a distribution point organizer: “*I think it’s a privilege of today that we can use remote payment, make life easier for ourselves, save time and do things that we like instead of counting money for a whole hour every Thursday*”, while in another DP distribution point the opposite view was held: “*I don’t think we’ll go back to that [money transfers] until the world goes completely virtual. As long as there’s cash, we’ll stick with cash*”. The organizer of this distribution point considered the process of digital payment to be more time-consuming, and therefore she decided to return to cash payments after the first wave of the pandemic. The attitude of the farmers proved to be diverse, with some accepting the convenience of payment by bank transfer, while others asked to return to the pre-COVID-19 pandemic payments in cash.

Discussion

We explored the resilience of a short food supply chain during the COVID-19 pandemic using the DP network as a case study. First, we focused on the dynamics of the DP network before and during the pandemic to determine if the specific network withstood the disruptions of the COVID-19 pandemic. Then, we analyzed the specific resilience elements, i.e., readiness, responsiveness, and recovery, to investigate how the network responded to a specific disruption. We also focused on innovations in the DP network because they could further the recovery of the network after the disruption.

Our findings suggested that food purchasing practices through the DP network differed before and during the COVID-19 pandemic in two main ways: (i) the starting phase of the pandemic was marked by rapid growth in the amount of food purchased through the network, and (ii) the pandemic furthered the demand for easy-to-prepare products as well as the introduction of product innovations in the network. Other studies of food shopping practices during the COVID-19 pandemic have confirmed the tendency for consumers to buy more food directly than before the pandemic (Chenarides et al., 2021; Pappalardo et al., 2022), as well as switching from supermarkets to online shopping and/or small local stores (Thompson et al., 2022). The pandemic also resulted in a strong orientation toward local products that could be purchased directly from farmers (Brum et al., 2022) and through short food supply chains (Baptista et al., 2022).

We analyzed the resilience of the DP network by focusing on the three elements of readiness, responsiveness, and recovery. The readiness of the DP network to the pandemic shock was manifested through several practical actions implemented before the COVID-19 pandemic, i.e., an online product ordering system, the introduction of digital payments, and an emotional attachment to the network. Emotional attachment is an intangible benefit of short food chains (Medici et al., 2021). Our results were consistent with those of other studies that also revealed that trust between consumers and producers had a specific role in demonstrating resilience during the COVID-19 pandemic (Atalan-Helicke and Abiral, 2021).

Previous studies assessed the readiness of supply chains through their ability to recognize, anticipate, and prevent risks before damage occurs (Chowdhury and Quaddus, 2016; Han et al., 2020), thus referring to readiness as a proactive resilience strategy that allows threats to be avoided (Hendry et al., 2019). Readiness is also connected to the planning process, thus furthering the mitigation of disruption (Chowdhury and Quaddus, 2016). In the case of the DP network, readiness was not a specific proactive strategy, implemented due to formal planning and risk analysis procedures, but was rather an *ad hoc* and coincidental activity that was managed through the crisis. Thus, we stress the ambiguous nature of readiness as a food chain resilience element.

The responsiveness of the DP network to disruptions caused by the COVID-19 pandemic was manifested through rapid adaptation to restrictions and adjustments to new patterns of consumer demand. This was characterized by activities such as the imposition of new rules in the DP network, changes in the product distribution system, and the introduction of new products. These novel activities in the network were undertaken largely by introducing organizational and product innovations. Responsiveness, along with readiness, were the main attributes that allowed the network to respond to the disruption and continue the food provisioning practices through the short food supply chain during all waves of the COVID-19 pandemic. Other researchers have also confirmed the crucial role of responsiveness in ensuring the resilience of food systems (Rajesh, 2021).

As a response to consumer demands, innovative food products such as ready-to-eat, ready-to-cook, and immunity-strengthening products were introduced in the DP network. When referring in more detail to product innovation in the network, the issue of product diversity is crucial. In our study sample, multi-functional farms could rapidly respond to new consumer demands, thus fostering even greater product diversity. The crucial role of product diversity in the resilience of food systems has been emphasized previously, e.g., in terms of the variety of crops and landscapes (Bajželj et al., 2020), the plurality of producers involved in the food chain (Atalan-Helicke and Abiral, 2021), and the diversity of food production and marketing practices (Coopmans et al., 2021).

The introduction of organizational and social innovations in the DP network was crucial to ensure its responsiveness to the pandemic shock. Other researchers have stressed the role of innovation as a factor in recovery that promotes long-term changes in food systems (Meixner et al., 2022). We agree that innovations are crucial in the implementation of long-term changes, but it should be stressed that their introduction is often a response to disruptions in the system. In our study, product innovations were introduced as a response to the disruption of food provisioning practices and the changes in daily lives. Recovery was also manifested through the return to the previous practices of direct communication and interaction of the DP network actors. Thus, the recovery was manifested through innovation, but conversely, also by returning to previous practices.

All three resilience elements, i.e., readiness, responsiveness, and recovery, were manifested in the short food supply chain and analyzed in this study. They were all reactive strategies to the COVID-19 pandemic, while in other studies the role of proactive strategies in food supply chain resilience has been stressed (Marusak et al., 2021).

Conclusions

There were statistically significant short-term effects observed in the DP network regarding food purchasing practices in the COVID-19 pandemic period, compared to the pre-COVID-19 pandemic period. The perceived effects of the COVID-19 pandemic by the actors of the DP network included changes in food purchasing practices, a decrease in direct social interaction, and innovations in the DP network. The changes in food purchasing behaviors through the DP network during the COVID-19 pandemic were closely connected to the shifts in everyday life, such as new daily routines, shifts in food purchasing habits from supermarkets to the DP network, and emotional reactions to the crisis, resulting in intense food buying at the beginning of the COVID-19 pandemic to build-up food stocks in homes. Because the time needed to adapt to the new circumstances for the DP network actors was very short, the DP network demonstrated itself to be a food chain that was flexible and able to adapt quickly in a crisis for both consumers and producers.

The beginning of the COVID-19 pandemic was characterized by food system readiness for the specific shock, which in the case of the DP network was manifested through a previously developed product ordering system, digital payments, and emotional attachment to the DP network. The responsiveness to disruption was manifested as the ability of the DP network to respond quickly to the new circumstances and product demand, which were affected by changes in rules, the product distribution system, and product innovations. The recovery from the crisis was associated with changes in the DP network management, operational practices, and the relationships between consumers and producers.

From the perspective of the food chain resilience elements, the reactive strategies of the DP network as a short food supply chain should be highlighted. Our data provided indications that the readiness of the network was due to coincidence rather than a proactive strategy to strengthen the resilience of the network. The introduction of innovations appeared as a response to the disruption, and their subsequent role in the recovery was then estimated.

There have been few other studies of short food supply chain resilience during the COVID-19 pandemic that are based on analyses of the different resilience elements. This study provided insights into how the elements of responsiveness, readiness, and recovery are practically manifested in short food supply chains, ensuring their resilience.

The main limitations of the study were connected to the time scale of the research. Because the data were gathered during the period when the COVID-19 restrictions were still ongoing the future impacts were not known, and the final recovery of the DP network was still not completely clear. There is a cyclical nature of resilience that develops during the response to a series of disturbances (Hendry et al., 2019), thus we present our research

as an insight into a specific time period of the COVID-19 pandemic. Future research should consider long-term changes and the recovery aspects of short food supply chains in the post-pandemic period.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

Author contributions

MU and TT: conceptualization, methodology, and writing—review and editing. MU: investigation, formal analyses, writing—original draft preparation, visualization, funding acquisition, and project administration. Both authors have read and agreed to the published version of the manuscript.

Funding

This research has been supported by the European Regional Development Fund (project id. N. 1.1.1.2/16/1/001) under the activity Post-doctoral Research Aid, Project No. 1.1.1.2/VIAA/4/20/682, Organic Farming and New Food Values—Drivers to Sustainable and Resilient Food Systems.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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RECEIVED 03 May 2023

ACCEPTED 13 June 2023

PUBLISHED 30 June 2023

CITATION

Maysels R, Figueroa Casas A, Otero
Sarmiento JD and Zuñiga Meneses SM (2023)
Conceptualization of alternative food networks
in Latin America: a case study of a local food
system in Southwestern Colombia.
Front. Sustain. Food Syst. 7:1216116.
doi: 10.3389/fsufs.2023.1216116

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Conceptualization of alternative food networks in Latin America: a case study of a local food system in Southwestern Colombia

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Alternative Food Networks (AFN) is a concept that has emerged in opposition to conventional food systems and the global food regime. AFN are localized food networks that connect actors from food producers to consumers creating a pathway that strengthens ecological, social, and economic sustainability. Much of the literature on AFN focuses on geographies and food systems in the Global North, often recommending schemes such as farmers' markets, community supported agriculture, organic certification, and fair trade. However, these strategies are not always appropriate for food systems in the Global South. In Colombia, small producers have maintained a parallel traditional food system, despite the growing pressure and investments to transition to a conventional food system. This research analyses the local food system of Cauca addressing the following questions: 1) what are the dynamics of the local food system in the Andean region of Cauca and 2) how can the local food system in the Andean region of Cauca be conceptualized as an alternative food network in the context of the Global South? To answer these questions, transdisciplinary research was carried out using SWOT analysis during multiple stakeholder workshops, followed by a reflexive thematic analysis of the results. The results show coexistence of both traditional and conventional food system dynamics, with participants assigning greater value to traditional food systems and agroecological production (akin to AFN literature), yet the economic insecurity and socio-political unrest that underlies daily life prohibits a more robust transition from conventional food system. It is argued that the understanding of AFN should be expanded to incorporate socio-cultural context as well as the dynamics of AFN in the Global South.

KEYWORDS

alternative food network, local food system, traditional knowledge, Global South, sustainable agriculture

1. Introduction

Food systems, which refers to the interconnected, multi-scale web of food production and food provisioning, play a key role in modern environmental and social crises. According to the [IPCC \(2022\)](https://www.ipcc.ch/report/ar6/wg2/) food systems are responsible for about 42% of anthropogenic greenhouse gas emissions, contributing significantly to climate change, as well as 70% of freshwater use,

biodiversity loss, and soil depletion (Millennium Ecosystem Assessment (MEA), 2005; De Schutter, 2017). These impacts are most often associated with 'industrial' or 'conventional' food systems, characterized by large-scale monoculture production, typically with mechanization and technification, where food travels through a long supply chain before it is consumed (Michel-Villarreal et al., 2019). Conventional food systems emerged as the dominant or 'mainstream' food system in many countries in the Global North in the second half of the 20th century, justified by the discourse that food needed to be produced on larger scales in order to feed a growing global population (Shaw, 2007).

As power in the food system became consolidated in the hands of corporations (supported by governments and international trade organizations), counter movements arose in opposition to the social injustices and environmental harm caused by the mainstream food system (Cleveland, 2014; Altieri and Nicholls, 2015; McMichael, 2016). Efforts that challenge the mainstream food system by prioritizing ecological health, social equity, and community relationships towards more localized food systems, are often referred to as Alternative Food Networks (AFN) (Feenstra, 1997; Whatmore et al., 2003; Wald and Hill, 2016).

The types of schemes that have been most studied in AFN literature are localization, community-supported agriculture, farmers' markets, organic certification, food cooperatives, solidarity purchasing groups, community gardens, and fairtrade (Harris, 2010; Goodman et al., 2012; Michel-Villarreal et al., 2019). Generally, there is support in the literature for AFN schemes as pathways to build trusting relationships between producers and consumers to increase access to healthy food (Whatmore et al., 2003; Tregear, 2011; Kremen et al., 2012). However, there is concern for AFN that become "exclusionary" or "elitist" with high costs of organic produce and fairtrade foods, or where access to farmers markets and food co-ops is limited or distant (Goodman et al., 2012), and as DuPuis et al. (2006) indicates, "localization" can often exacerbate social injustices in food systems.

Although the concept of AFN has become more widespread, the vast majority of AFN literature focuses on food systems in the Global North, particularly the United States, Canada, Europe, the United Kingdom, and Australia (Holloway et al., 2016; Michel-Villarreal et al., 2019). AFN schemes have become part of the sustainable food movement discourse in countries of the Global North, where behaviors and business models are driven by ecological and social values (Reckinger, 2022). There is a gap in the literature exploring AFN in the Global South¹, despite the need to bolster sustainable food systems (Guibrunet et al., 2023). In Latin America, for instance, the conventional food system is becoming more problematic and would benefit from AFN research.

Given Colombia's vast cultural and biological diversity, as well as its complex socio-political history, this Global South country was used as a case study in this research to evaluate the food system in its Andean region in the southwestern department of Cauca as a model of an AFN in Latin America. The Colombian food system transformed with the arrival of the Green Revolution and the vigorous promotion of rural development by the State, together with the neoliberal period of trade liberalization in the 1990's (Roa-Clavijo, 2021). Conventional food systems became more prevalent, shifting from small scale, local production using traditional methods to more export-driven production using industrial agricultural methods (León Sicard and Rodríguez Sánchez, 2002; Correa and Forero, 2008). The growing demand in the international market for cash crops such as sugar cane, coffee, beef, and bananas incentivized Colombian farmers to prioritize production of these commodities, contributing to the decrease in agrobiodiversity throughout the country and adopting conventional agricultural methods more widely (Corporación Grupo Semillas y Vélez Ortiz, 2019).

Yet, despite the efforts to industrialize the Colombian food system, small-scale producers throughout rural areas of the country were able to resist and maintain much of their traditional food systems (Roa-Clavijo, 2021). This is especially evident in the Andean region of the department of Cauca. Cauca is an agrarian society; over 60% of the population lives in rural areas and agricultural production is the main livelihood (Departamento Administrativo Nacional de Estadística (DANE), 2018).

Small-scale peasant and indigenous farmers make up the majority of food system producers in Cauca, sustaining an alternative food system with significant local production and consumption, bartering networks, preservation of landrace varieties, traditional practices, and a plurality of knowledge systems. However, the local food system is not without conventional agricultural activities with related impacts such as deforestation, water insecurity, ecological degradation, and social inequalities in the region (Etter et al., 2008; Ruiz et al., 2017). There is a gap in literature regarding the dynamics and relationships of the local food system in Cauca; the tacit knowledge of food systems actors has not been sufficiently explored.

Given the complex web of 'traditional' and 'conventional' activities in the food system of the Andean region of Cauca, the following research questions are addressed in this study: 1) what are the dynamics of the local food system in the Andean region of Cauca and 2) how can the local food system in the Andean region of Cauca be conceptualized as an alternative food network in the context of the Global South? To answer these questions, transdisciplinary research was carried out through multiple workshops with stakeholder participation, and an analysis of the results was conducted using reflexive thematic analysis.

2. Theoretical and methodological approach

In this research, the alternative food network in the Andean region of Cauca is approached from food system studies, using socio-ecological systems framework. Socio-ecological systems (SES) contain multiple subsystems, which are in constant interaction, producing complexities and emergent properties (Ostrom, 2009). Food systems are inherently complex, due to the relationships between biological,

1 In this paper the terms 'Global South' and 'Global North' are used to differentiate socio-political and economic dynamics among countries more so than to denote geographical locations (Braveboy-Wagner, 2009). The concept of the 'Global South' (Latin America, Africa, parts of Asia, and Oceania), refers to countries or regions with similar experiences of endured colonialism, imperialism, and more recently, neoliberalism (Dados and Connell, 2013). While flawed, the concept attempts to encompass the general "spirit" of the regions, highlighting efforts of decolonization, plurality of knowledge systems, and opposition to the hegemonic world power structure (Grovo, 2011).

cultural, and social subsystems, requiring a framework that allows for the analysis of multi-scale, nonlinear interactions (Allen and Proserpi, 2016; Vallejo-Rojas et al., 2016).

Food systems are comprised of distinct dimensions throughout the food supply chain from production, to processing and packaging, distribution, commercialization, consumption, and finally, disposal (Ericksen, 2008; Ericksen et al., 2009; Virapongse et al., 2016). It is important to determine the scale at which a food system is being evaluated, given that the scope and relevance of each dimension will change accordingly. In this study, the local food system of the Andean region of Cauca was analyzed considering the following seven dimensions: cultivation, harvesting, packaging, transportation, commercialization, consumption, and disposal, integrated into the socio-ecological system (including traditional knowledge and practices), considering the interaction with biogeochemical and climate conditions as well as the political, economic, and socio-cultural conditions (see Figure 1).

To compliment socio-ecological systems framework, food regime analysis was also applied to incorporate an historical and geo-political lens of the local food system in Cauca. The concept of food regimes, development by Friedmann and McMichael (1989), claims that during periods of (relative) political stability, hegemonic powers emerge which drive socio-economic trends in the global food system. Given that food systems are connected across scales, trends in the global food system affect dynamics in food systems at national, regional, as well as local levels. In applying a food regime analysis (McMichael, 2009; Pritchard, 2009; Bernstein, 2016), historical elements, power dynamics, and political influences have emerged that have had significant impacts on the local food system in the Andean region of Cauca.

Considering these frameworks, transdisciplinary research was carried out through four workshops with multi-stakeholder participation representing different roles within the alternative food network in the municipalities of Silvia, Cajibío, Totoró and Popayán, which are located in the Central range of the Andes mountains in the Southwestern department of Cauca, Colombia (see Figure 2).

The region is part of the Upper Cauca River Basin, which is one of Colombia's most important river basins economically, biologically, and culturally, traversing the country from the Central range of the Andes to the Northern Atlantic Ocean. The altitude ranges from 1,200–3,800 m.a.s.l. in high Andean and cloud forest ecosystems. The region has a cold and wet climate with temperatures ranging from 5 to 24 degrees Celsius and a high average annual precipitation of 2,000 mm (Alcaldía de Popayán, 2020; Alcaldía de Silvia, 2020). The main economic activity of the region is agricultural production, due to the suitable climate and soil conditions, as well as the abundance of water sources. The region is also rich in cultural diversity with distinct ethnic groups.

For this research, workshops were carried out in rural areas in each of the four municipalities over a one-month period in 2022 with 143 participants, most of whom identify as members of indigenous or peasant communities. Participants were recruited through two research projects already taking place in the region that had developed connections with food system actors: the Water Security and Sustainable Development Hub, and SHARE – Water and Food Security Strategies for the Economic Reactivation in the department of Cauca. Participants represented different roles within the food system; from home gardeners, ranchers, dairy farmers, commercial farmers, to prepared food vendors, restaurant owners, and representatives of local government.

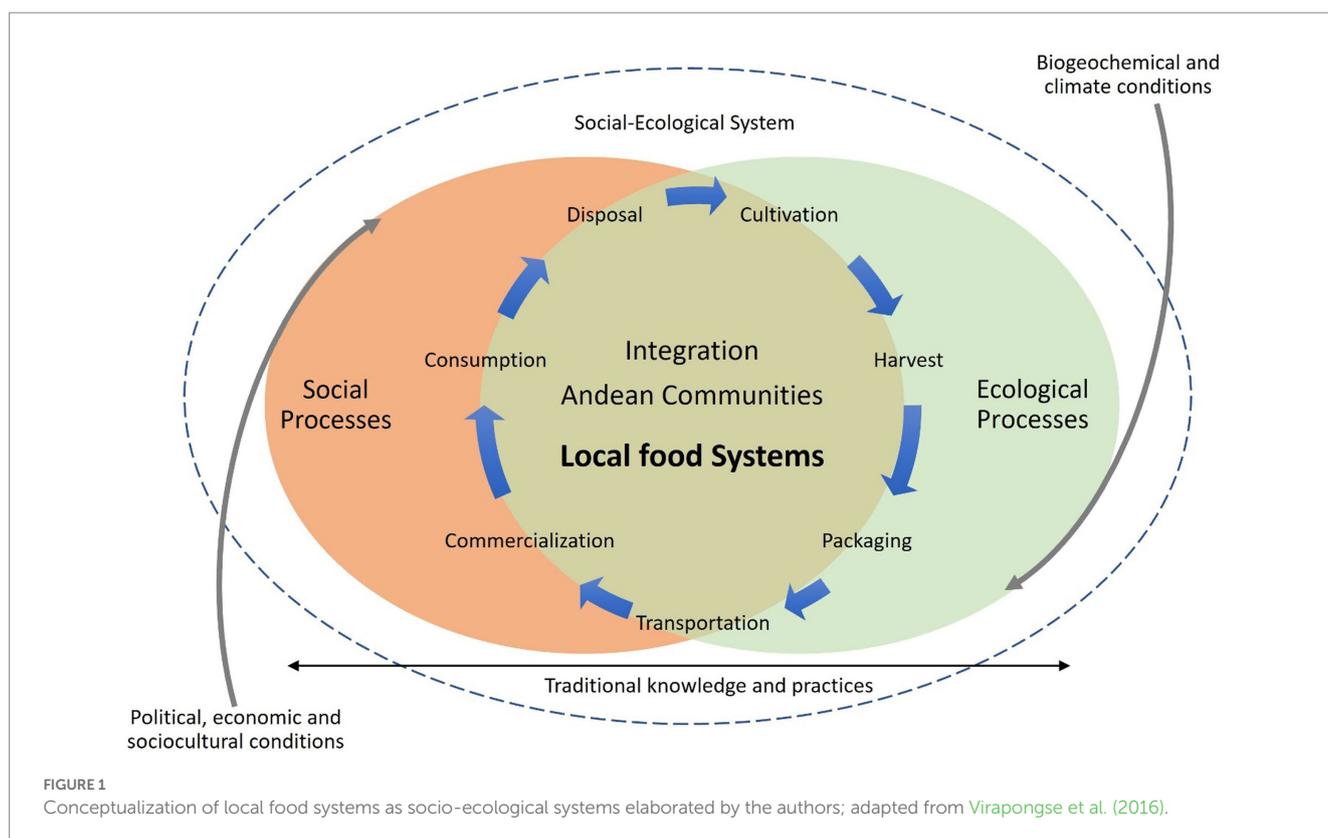


FIGURE 1 Conceptualization of local food systems as socio-ecological systems elaborated by the authors; adapted from Virapongse et al. (2016).

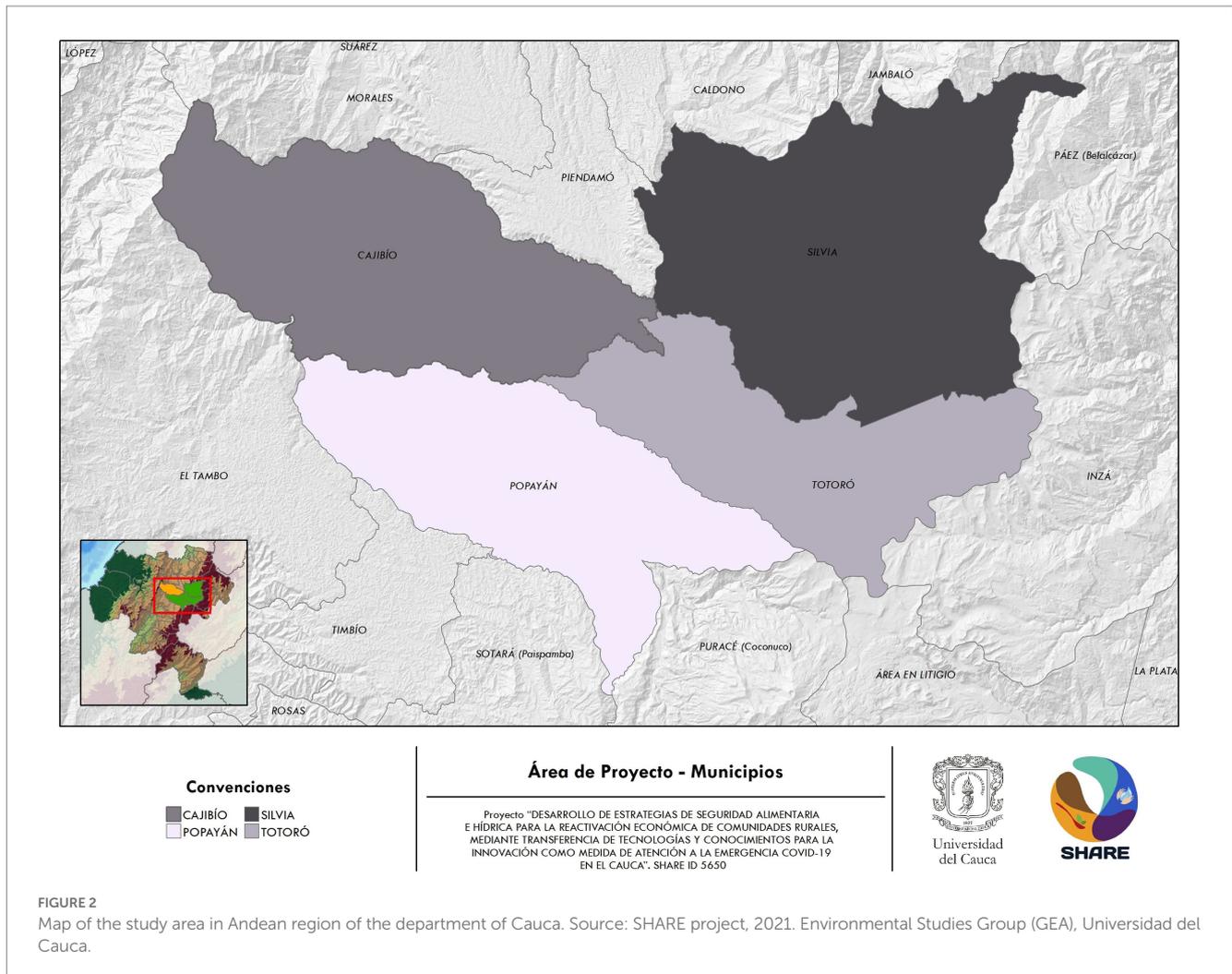


FIGURE 2

Map of the study area in Andean region of the department of Cauca. Source: SHARE project, 2021. Environmental Studies Group (GEA), Universidad del Cauca.

Local actors were involved in the study as part of a co-creation process to better understand the realities of the food system from place-based experience and expertise, together with academia. This transdisciplinary approach allows for mutual learning for both actors and researchers bringing together different knowledge systems (Scholz and Steiner, 2015a,b). This is especially important for the analysis of the alternative food network in Cauca, as there is not a wide array of data available, and the in-depth territorial knowledge of local actors is crucial for insight into the socio-ecological complexities of the system (Foran et al., 2014; Lamine, 2015; Polk, 2015).

To answer the first research question, ‘what are the dynamics of the local food system in the Andean region of Cauca?’, participants carried out a SWOT analysis to identify the strengths, weaknesses, opportunities, and threats for each of the seven dimensions of the local food system. In each workshop, four to five groups were formed based on geographical location, and facilitators guided each group to record their analysis on poster paper (see Figure 3). At the end of the activity, each group presented their SWOT diagram, which was recorded, and the audio was transcribed.

Subsequently, the 18 SWOT diagrams developed across the four study areas were combined and digitalized in Excel. A reflexive thematic analysis was carried out (Braun and Clarke, 2006; Braun and Clarke, 2019; Terry and Hayfield, 2020) in three phases: 1)

familiarization of the data, where researchers reviewed the results based on discussions and participant observation during the workshops, 2) coding of the data, which was developed inductively during analysis, and 3) determining emergent themes, based on grouping of the codes and the narrative of the transcripts.

To address the second research question, ‘how can the local food system in the Andean region of Cauca be conceptualized as an alternative food network in the context of the Global South?’, the emergent themes identified from the SWOT analyses were compared to aspects of AFN literature in the discussion section.

3. Results and analysis

3.1. Results of SWOT analysis of Cauca’s local food system

In order to consider the food system of the Andean region of the department of Cauca as a model of an alternative food network, the dynamics of the food system had to first be identified. SWOT diagrams developed by workshop participants produced an extensive matrix of data, which was subsequently condensed by consolidating similar responses (see Supplementary Appendix S1) and then summarized

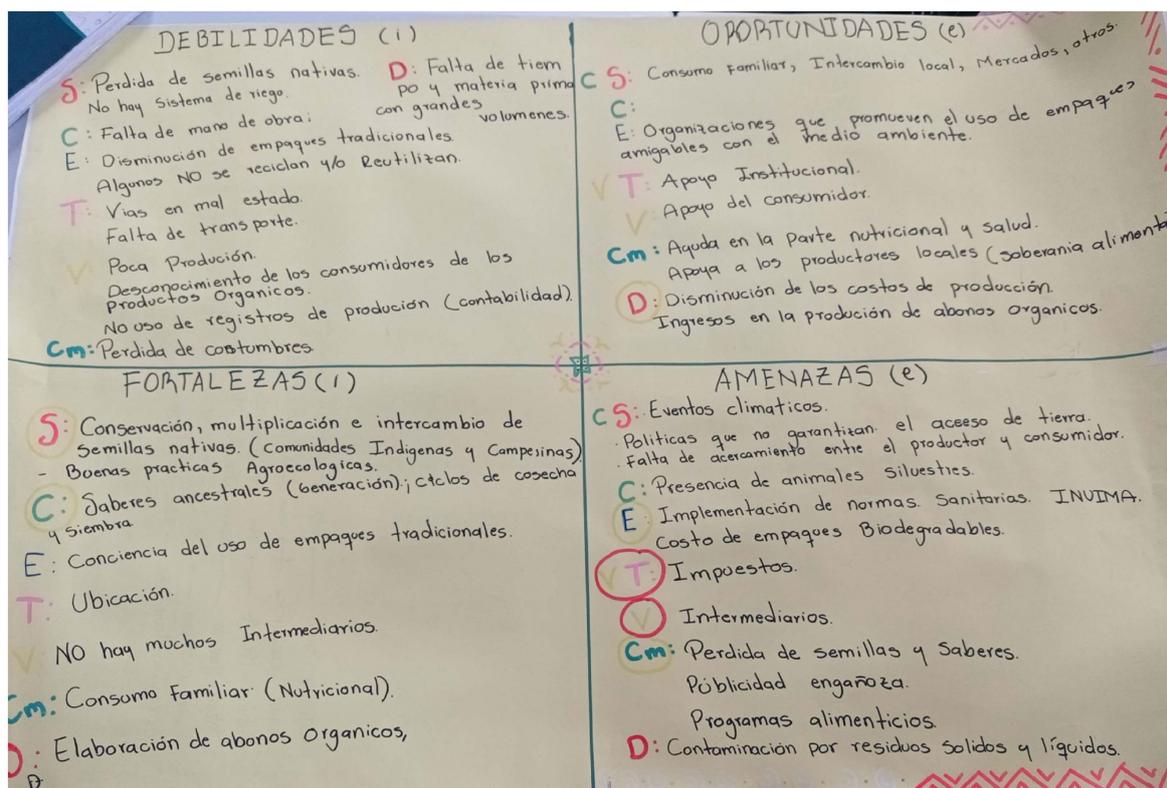


FIGURE 3 SWOT diagram developed in the workshop in the municipality of Popayán.

into the principal strengths, weaknesses, opportunities, and threats for each of the seven local food system dimensions as shown in Table 1. Due to the wide range of responses, only those repeated most frequently across the four study areas were included in the results.

Strengths identified for the local food system highlighted activities that are carried out and propelled by rural communities. Existing sustainable agricultural processes, for example, are rooted in traditional knowledge of the diverse cultural groups in the region, as well as processes to recover and sow landrace and native seed varieties. The incorporation of technical, scientific agricultural knowledge, such as agroecology, was considered to strengthen sustainable agriculture efforts as well. The trade networks and associations that communities have formed, together with diverse epistemologies applied to agricultural production, has resulted in robust localization of food production and consumption in the region.

The weaknesses assigned to the local food system during the workshops were associated with endogenous behavior of their own communities that they wish to improve. Most notably, conventional agricultural practices such as use of agrochemicals were considered to harm the health of themselves and the environment. This was in part credited to a lack of awareness, but more so due to the delayed benefits of transitioning to more sustainable practices. Many participants are not financially stable and expressed concern that yields would decrease if they stopped using chemical fertilizers and pesticides, resulting in inability to earn enough to feed and sustain their families.

The opportunities recorded directly addressed many of the weaknesses identified by participants. Underlying many of the responses was the opportunity to recover, preserve, and apply

traditional knowledge towards processes in all seven dimensions of the food system including cultural recipes, learning from elders, cultivation rituals, plant-based food packaging, and seed saving. Additionally, trainings and capacity building were often listed as strategies to strengthen commercialization of products as well as transitioning towards sustainable agricultural production. Participants noted the importance of institutional support for trainings, as well as the participation of experts from their own communities.

The threats that participants noted were exogenous dynamics that affect Cauca's local food system. Liberal trade policies, such as the Colombia – U.S. free trade agreement, were identified as negatively impacting the diet of communities as well as creating more competition within the market for staple foods. Moreover, climate change and climate variability were considered threats during cultivation, harvesting, and transportation. Extreme weather conditions combined with poor road infrastructure and frequent road blockages create difficulties in food distribution.

3.2. Results of the reflexive thematic analysis

For the first phase of the reflexive thematic analysis, the raw data from the 18 SWOT diagrams was coded inductively among three researchers. This process went through several iterations until the researchers were in agreement with the distinction between the codes. At the end of this stage, 21 unique codes were produced. After reviewing the frequency of the codes, two codes were found to appear

TABLE 1 Summarized results of SWOT analysis.

Food system	Summarized strengths, weaknesses, opportunities, and threats
Cultivation	S: preserved landrace and native seed varieties, traditional knowledge applied
	W: degraded soil, conventional agricultural practices, loss of landrace seeds, lack of land access
	O: seed and knowledge exchange, support for sustainable agriculture trainings
	T: climate change, pests and disease, hybrid and transgenic seeds, illicit crop production
Harvest	S: subsistence production, traditional knowledge applied
	W: crops contaminated with agrochemicals
	O: sustainable agricultural practices, subsistence production, planning with agricultural calendars
	T: climate change, pests and animals, lack of farm labor
Packaging	S: traditional, biodegradable packaging for food products
	W: extensive use of plastic, environmental pollution, lack of awareness
	O: return to traditional packaging materials, alternative materials training
	T: packaging regulations, foreign market demands, high cost of biodegradable materials
Transportation	S: high rate of local food consumption, producer-run associations, community organization
	W: roads in poor condition, absence of roads, uncommon to own private vehicles
	O: producer-run associations, community transport options, institutional support
	T: climate change, extreme weather, landslides, high fuel and transport costs, roadblocks
Commercialization	S: producer-run associations, diversity and quality of produce to sell, barter and trade
	W: high competition in markets, inadequate records, lack of value-added products
	O: farmers markets, direct sales from producers to consumers, publicity and marketing
	T: low costs of imported products, price instability, intermediaries, free trade policies, conflict
Consumption	S: subsistence production, preservation of traditional foods, availability of diverse food products
	W: preference of external and processed foods, loss of traditional food preparations
	O: recover traditional recipes, cultural gastronomy workshops, education re. organic food
	T: influence of modern diet, health impacts from processed foods
Disposal	S: existing processes of organic fertilizer production, organic waste supplements animal diets
	W: environmental pollution, common to burn garbage, lack of awareness
	O: production and sale of organic fertilizers, recycling business, educational workshops
	T: no trash or recycling collection in territories, lack of institutional support

much more often than the rest: ‘traditional knowledge and practices’, and ‘costs and earnings’, as shown in Figure 4. This was the case throughout the four study areas and across cultural groups.

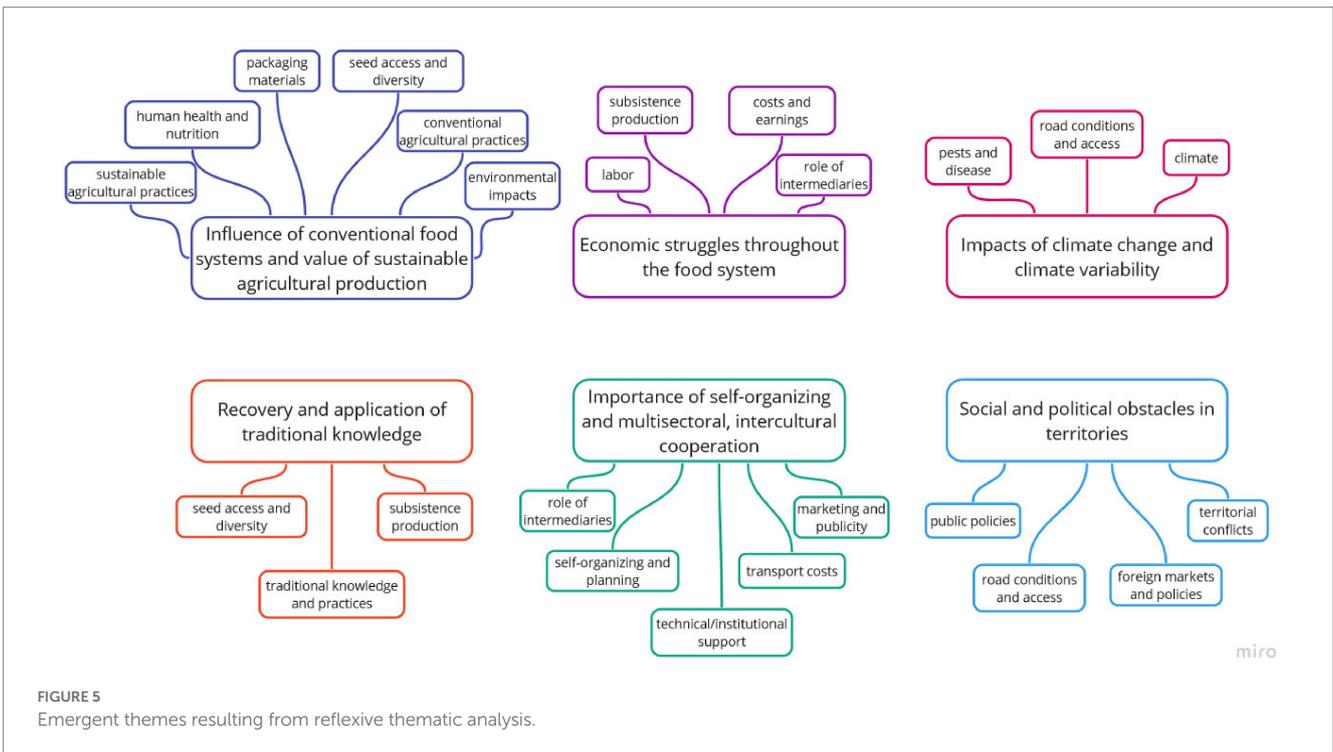
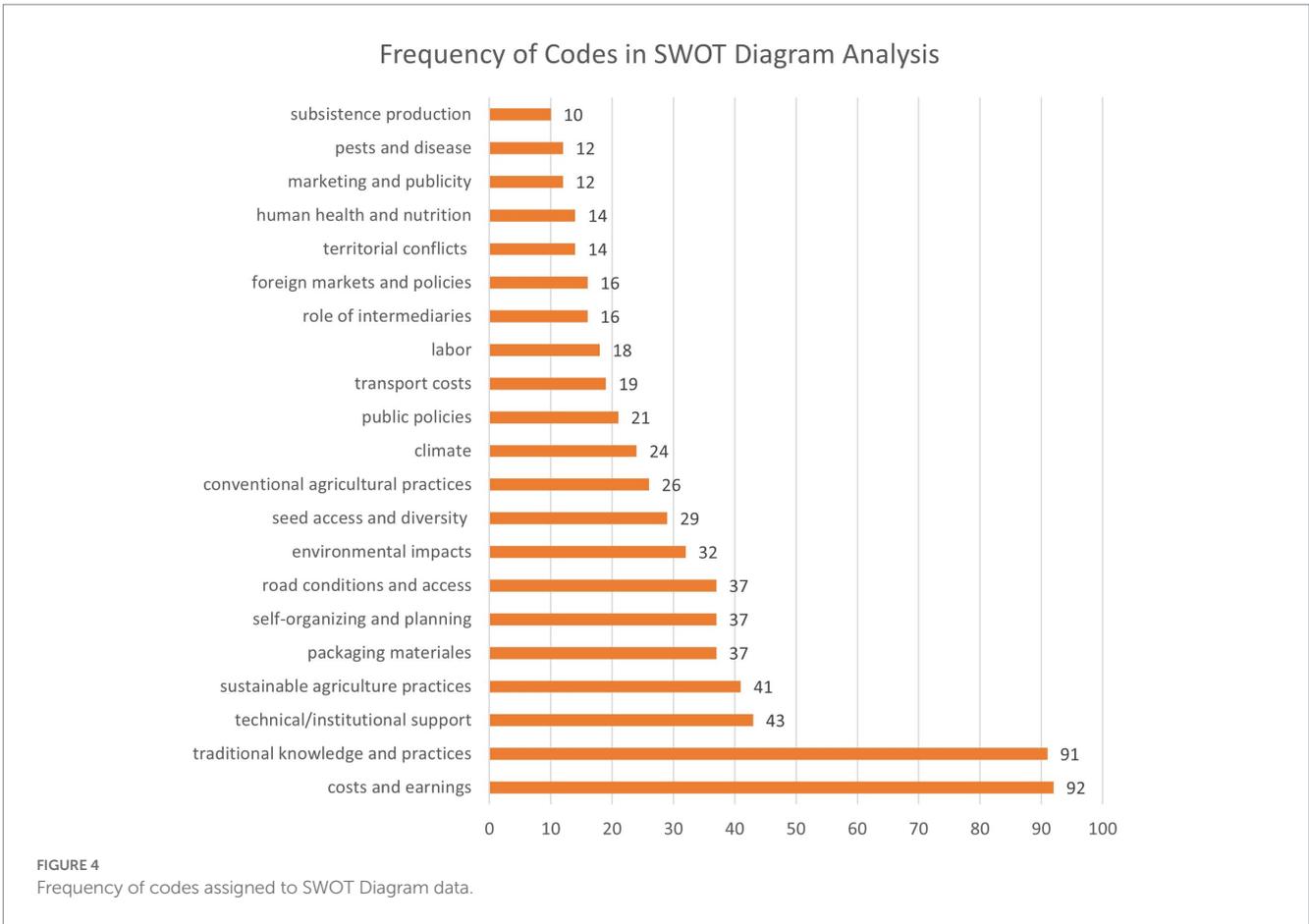
During the second phase of the reflexive thematic analysis, the codes were grouped together according to similarity of content. This was also an iterative process, as researchers did not all interpret the responses of participants in the same manner. In these cases, transcriptions from the workshops were used to corroborate researchers’ decisions. Once codes were grouped together, themes were assigned that attempted to capture the emergencies in the data. The six emergent themes and their corresponding codes are shown in Figure 5. Codes were not exclusive to each theme; some did overlap according to the content of individual data. The themes that emerged were: 1) Influence of conventional food systems and value of sustainable agricultural production, 2) Economic struggles throughout the food system, 3) Impacts of climate change and climate variability, 4) Social and political obstacles in territories, 5) Importance of self-organizing and multisectoral, intercultural cooperation, and 6) Recovery and application of traditional knowledge. These six themes are considered defining characteristics of the local food system in the

Andean region of the department of Cauca, according to the participants. Each theme is explored in further detail below.

3.3. Influence of conventional food systems and value of sustainable agricultural production

Participants expressed concern for the widespread implementation of conventional agriculture practices, particularly the increasing area of monocultures sowed with “*non-native*”² seeds, and the continual use of agrochemicals. The overapplication of agrochemicals was associated with the pollution of waterways and degraded soils in their territories. Native and landrace seed varieties are thought to have disappeared due to the widespread use of transgenic and hybrid seeds.

² Words/phrases in italics are direct quotes taken from SWOT diagrams or transcriptions that have been translated.



A young indigenous farmer from Guambia noted, *“The pollution and loss of culture is very complicated, using transgenic seeds...it is very difficult to continue opting for them in our land, since our land is becoming more and more contaminated and destroyed.”*

“Contamination” of foods grown with agrochemicals is also a concern in the local food system. Participants deemed it “unsafe” for their health that they regularly consume “products with a lot of chemicals.” They regard the quality of their food to have decreased, as the land can no longer produce “good quality” crops as it once did, due to agrochemical use. Moreover, participants considered that the adoption of a more westernized diet has negatively affected nutrition in the region. They reported that people are eating less fruits and vegetables, while consuming more processed “junk” foods with little nutritional value, attributing the change in diet to higher rates of disease, food insecurity, and poor nutrition in their communities.

Participants are aware of and concerned by the ecological degradation occurring in their territories; often citing conventional agricultural production as the main driver. Throughout the region there is a growing movement to transition towards “clean” and “agroecological” production, and participants highlighted sustainable agricultural production as an opportunity to strengthen their food systems. Among the practices mentioned were planting more native species (both in cultivated and natural ecosystems), increasing organic fertilizers and compost application, expanding agrobiodiversity, improving soil health, and fortifying seed banks. Of these, seed sovereignty was emphasized across the four study areas. A peasant farmer from Cajibío expressed, *“It is important to consider the issue of seed autonomy. Usually commercial seed come specialized, adapted to specific systems. I believe that we should stop depending on external seeds and have our own seed banks.”*

3.4. Economic struggles throughout the food system

Participants highlighted the economic hardships that many rural families face in the region. They associated behaviors within the local food system to economic necessity and survival, rather than value driven. For example, farmers tend to prioritize cultivation of commodity crops that are more easily sold in markets and thus, solely produce those crops as monocultures in order to maximize profit. Over time more farmers transitioned away from subsistence production to commercial production, resulting in families having to purchase more of their food than before. This phenomenon was expressed by a peasant farmer in Totoró: *“There is something that happens in our territories nowadays, we commercialize a lot of what we produce. And a big mistake, is that we take the best to sell and we keep the smallest...as if just the leftover is for us, as if we were more interested in the economic part than in feeding ourselves.”*

Concern was raised about the low profit producers earn, compared in proportion, to the final price of the products. According to participants, price instability in markets and the power of intermediaries stifle profits for producers. High competition in local markets forces producers to either substantially lower their prices or sell their products at a reduced value to intermediaries who sell their products in markets outside the region at a much higher price point. This dynamic favors intermediaries and gives them bargaining power thereby putting producers at a disadvantage. To address this issue,

participants advocated for the diversification of their production as well as generating more value-added products.

3.5. Impacts of climate change and climate variability

Climate variability and climate change was identified as threatening to crop production. While the region is lush with springs, lakes, wetlands, and rivers, participants noted that water access and availability has become increasingly difficult, especially with prolonged periods of El Niño (drought) and La Niña (downpours). Severe rainfall caused by the weather phenomenon La Niña, has led to mudslides and landslides in the region, impeding movement in rural areas. An indigenous rancher from the Kisgó reservation expressed, *“In terms of transportation, we also saw the deteriorated roads as a threat, because now with the change in climate and the heavy downpours, we can also have a landslide or a road that is not really suitable for us to transport ourselves and our products.”*

Farmers have also noticed that their crops are inflicted more frequently with pests and diseases with the changing climate, many of which have built resistance to chemical pesticides, insecticides, and fungicides. The reduction of wildlife habitat has also led to an increased presence of animals consuming crops before they are harvested.

As an adaptation strategy for facing climate change and climate variability, participants advocated for the use of native and landrace seeds, which they considered to be better adapted to the region versus hybrid or transgenic seeds. Participants also claimed that cultivating native and landrace varieties leads to a more balanced ecosystem, allowing crops to better resist pests and disease.

3.6. Multi-scale social and political obstacles

Participants noted various social dynamics and trade policies that have caused challenges in the regional food system. Regional and national strikes were identified as threats to the food system; particularly when they lead to blockades on the main highway that connects the department of Cauca with the rest of the country. Within the territories, communities may face blockades, threats, displacement, or violence from armed rebel groups and other hidden actors. It was noted that while interactions with armed groups is no longer a daily occurrence, it is still a danger that overshadows the region. Participants identified the expansion of illicit crop cultivation (often carried out by armed groups) as a serious issue that is a) deteriorating surrounding ecosystems, b) occupying valuable, fertile land, and c) taking away farm laborers (especially young people) by offering wages that are tenfold what typical farm operations can offer.

Participants considered small producers to be at a disadvantage in markets due to trade policies. The Free Trade Agreement (FTA) between Colombia and the U.S.A. was most frequently identified as a threat to the regional food system. Participants claim that because of the FTA, the same agricultural products that they produce are imported by Colombia at lower prices, undermining sales, and creating high competition within markets.

Geopolitically, the war in Ukraine was identified as a threat to the food system, due to the drastic price increase of fertilizers. While many farmers want to eventually transition to organic agriculture, many are still dependent on inorganic fertilizers. Participants claim that organic fertilizers and other organic farm inputs are becoming more widely used, because of economic necessity. As a peasant farmer from Cajibío stated, “*I think it is important for us to think and reflect on the actions we should implement to address the fertilizer crisis unleashed by the war in Ukraine. It has affected us, and we must think about alternatives.*” This statement demonstrates that actors of the food system are aware of the connectivity across spatial scales and the effects of modern globalization.

3.7. Importance of self-organizing and multisectoral, intercultural cooperation

There is a strong sense of autonomy in peasant and indigenous communities in the region, and their ability to self-organize and carry out effective action is vital for their way of life. This was noted in the practice of *mingas*, which is a traditional form of communal labor in indigenous communities, where a group of community members work together on a task such as building or harvesting at one person's property (wage-free), and when they are done, move to another property for the next task. Self-organization was identified more formally in peasant/producer-run associations, where decision-making power is distributed among members, and as a united front, have more power in the food system. One of the biggest challenges rural producers face is transporting their goods from farms to markets, as most small producers do not own their own vehicle, and the prices of public transportation have spiked in recent years. Participants proposed forming more producer-run associations to address this issue. Co-owning vehicles, for example would reduce transport costs and reduce dependency on intermediaries to sell their produce. A peasant farmer from Popayán expressed that, “*Sometimes they pay us well for the products, sometimes not so well, and that does not really compensate the production costs. Payments are unfair to the producer versus the product.*”

In addition to self-organizing within communities, participants also valued endeavors in collaboration with other communities as well as institutions in private and public sectors. Participants throughout the four municipalities noted the importance of strengthening agricultural networks between communities for processes such as seed trading, bartering goods and materials, *campesino-a-campesino* horizontal knowledge exchange between communities, and more. Participants also acknowledged the supportive role of institutions, calling for more trainings and capacity building for topics such as packaging and storing food, creating value-added products, fabricating and selling organic fertilizers, bookkeeping, and farm planning. With cooperation from local governments, participants aspire to implement more farmers' markets, for the perceived benefits to producers, consumers, the local economy, and to strengthen the rural–urban connection in the region.

3.8. Recovery and application of traditional knowledge

Despite the heterogeneity of the participants, nearly everyone agreed that the preservation, recovery, and application of “*traditional*”

and/or “*ancestral*” knowledge is the preeminent pathway to strengthen the food system in Cauca. Both indigenous and peasant communities are taking measures to put this into practice, such as creating spaces for intergenerational learning and capacity building, developing seed networks and seed banks, recovering traditional packaging (i.e., plantain leaf, agave fiber, cassava sealant), preparing cultural dishes, cultivating according to moon phases, carrying out rituals for seed selection, implementing ancestral farming techniques, and many more.

Food has significant cultural importance for communities in the Andean region of Cauca; their values, worldviews, history, and social relationships are interwoven into the way they grow, share, prepare, and consume food. Many traditions and customs involve food for peasant and indigenous communities, and culturally important dishes are prepared with staple crops of the region such as beans, potatoes, squash, and most commonly, corn. As noted by a Kishu elder, “*The main cultural crop is corn. It is the source of life for us as indigenous peoples, and let us say that in order to develop the planting of corn, we take into account the rituals, the lunar phases, the selection of seeds, the mingas, which can be family or community.*” Corn is used versatily and transformed into many popular dishes such as *mazamorra*, *arepas*, *sancocho*, *envueltos de choclo*, *tamales*, and *chicha*, which are staples for daily diets as well as for special occasions such as holidays, cultural festivals, rituals, and offerings.

Elders in the communities are held in high regard; participants identified them as the keepers and principal transmitters of traditional knowledge primarily through oral narration. For indigenous communities, this transmission of knowledge most often occurs at home. An elder from the indigenous reservation of Ambaló shared that, “*for us, a very important space is the tul, which is what we call the gardening space we have around the house; a space for learning and family teaching.*” As such, home gardening is essential for cultural practices, but it also is a vital source for food supply for rural families. Participants noted that the majority of peasant and indigenous families have a home garden where they cultivate herbs, vegetables, and medicinal plants for subsistence use.

4. Discussion

In the results section, the first research question of this study was addressed, identifying the dynamics of the local food system in the Andean Region of Cauca. Dynamics associated with both conventional and alternative food systems emerged. The themes identified in the reflexive thematic analysis revealed the complexities of the local food system and coexistence between traditional and conventional practices.

To continue, the second research question is addressed; how can the local food system in the Andean region of Cauca be conceptualized as an alternative food network? The dynamics of the food system in Cauca, in some part similar to the concept of AFN, has underlying differences that go beyond the understanding of AFN in the Global North. The themes that emerged from the SWOT analysis confirm that many dynamics of the food system in the Andean of region of Cauca are in opposition with conventional food systems. Advocacy for sustainable agriculture production, localization, collectives, challenging power structures, and strengthening relationships between producers and consumers is aligned with AFN literature carried out in the Global North. However, other aspects including

ontological and epistemological pluralism, connections with territory, and behaviors driven by economic necessity diverge from AFN discourse.

The application and expansion of conventional agriculture was widely recognized among participants as detrimental for human health, for the longevity of their production systems, and the environment (degradation and erosion of soils, water pollution, reduction of biodiversity). This is a pattern seen across Colombia, driven by national incentives for economic development in rural areas as far back as the 1960's, evidenced in the Integrated Rural Development Programs which promoted export production and animal husbandry in the countryside (Correa and Forero, 2008; Roa-Clavijo, 2021). Colombia's biological and agricultural diversity has decreased considerably since the widespread adoption of conventional agriculture, particularly in the Andean region (Corporación Grupo Semillas y Vélez Ortiz, 2019), which lead to grassroots popularity in sustainable agricultural alternatives. This is in line with AFN literature, which promotes sustainable production approaches such as organic, diversified farming systems, regenerative, climate smart agriculture, and agroecology (Renting et al., 2003; Kremen et al., 2012; Michel-Villarreal et al., 2019).

Agroecology was identified by participants in the SWOT analysis as both strengths and opportunities in the Cauca food system. Since the 1980s, agroecology has gained traction in Latin America, and there is an extensive network of agroecological projects, academic programs and research studies, as well as social activism throughout the region (Altieri and Toledo, 2011). Studies in Latin America have shown that small-scale farmers applying traditional and agroecological methods can produce higher yields on smaller plots of land compared to conventional agriculture (Altieri and Nicholls, 2008; GRAIN, 2014), and that agroecological systems are more resilient against hurricanes and drought (Holt-Giménez, 2002; Murgueitio et al., 2011; Rosset et al., 2011; Jacobi et al., 2013; San Martín, 2015).

Despite the value participants allocated to "sustainable" and "agroecological" production, there is still a substantial amount of conventional agricultural activity in the region. Many participants admitted to using agrochemicals and transgenic seeds, attributing their resistance to transition to agroecology to a lack of knowledge and delayed results regarding yield. While many producers aspire to produce organically, they do not have the resources (time, labor, capital) to do so, and have a more imminent need to earn wages and feed their family. There is a high rate of poverty and food insecurity in the region; in 2018 Cauca was ranked the third poorest (monetarily) department in Colombia, with a poverty rate of 50.5% (Departamento Administrativo Nacional de Estadística (DANE), 2020) and 20–30% of households in Cauca are considered food insecure (World Food Programme, 2023).

These conditions explain why there is low demand for AFN schemes such as organic produce, community supported agriculture, or fairtrade certification in the region. From the consumers' perspective, it is not feasible to pay more for organic produce, miss work to attend a farmers' market, or pay a large sum of money upfront for community supported agriculture programs. Similarly for producers, these schemes do not result in enough profit, and put them at risk of losing money; driving them towards conventional production to ensure sales (Pasquier Merino et al., 2022). From the perspective of AFN in the Global North, this dynamic may be judged as 'bad behavior' contributing further to conventional food systems, but it is

important to distinguish between the values of the food system actors and their behaviors. As shown in the results of this study, food system actors do value ecological, economic, and social sustainability, yet the intersectional challenges they face keep them in survival mode, unable to construct the food system they would like.

This is not to say that the food system in the Andean region of the department of Cauca does not exhibit dynamics of alternative food networks. "Localization" is prominent within the Cauca food system, resulting in a strong connection between consumers and producers, although it differs from the discourse in AFN literature in the Global North. Localization typically refers to transitioning from sourcing foods worldwide and purchasing from supermarkets and chain stores, to buying from a limited spatial range, usually bound by "food miles" (McMichael, 2009; Cleveland et al., 2015). In Cauca, it has long been the norm to source food staples such as produce, bread, sugar cane, and cheese from within the department, most often food shopping in open market *galerías*, comprised of food stalls and small vendors. More recently, there has been a shift towards sourcing foods such as coffee and grains from smaller and local producers, instead of from corporate suppliers.

In this regard, there is a push to create more opportunities for more direct sales between producers and consumers in the region. While some farmers' markets and direct purchasing do exist, there is a great deal of interest from both consumers and producers to expand these efforts. Goodman et al. (2012) suggests that this transformation is more effective when driven by consumers as the agents of change; results reveal that producers do not believe that they know what their consumers want. In general, participants believe that actors of the Cauca food system need more education regarding the benefits of direct purchasing as well as organic food. This path offers potential to strengthen the alternative food network, increase profit and empower producers, and build trust among actors (Whatmore et al., 2003).

Seeds have an important role symbolically and culturally for indigenous and peasant communities in the Andean region of Cauca, which is distinct from most AFN literature. Many of the dynamics identified by study participants were related to seeds, such as connection with territory, adaptation to climate change, cultural identity, rituals and offerings, autonomy, diversification, and preservation of traditions. In Cauca and Colombia in general, there has been an ongoing struggle for seed sovereignty due to the influx of transgenic seeds, making it more difficult for small-scale farmers to preserve landrace and native varieties (Correa and Forero, 2008; Merino, 2020). The concentration of seed production and ownership has caused a 90% reduction in agrobiodiversity in the Global South, resulting in protests and seed sovereignty movements (Holt-Giménez and Patel, 2009). This issue may not appear as much in AFN in the Global North due to the widespread adoption of modern seed varieties and erasure of indigenous culture and traditions. However, for small producers seed sovereignty is pivotal to resist conventional food systems, as only four corporations monopolize the global seed industry: Bayer, Corteva, Syngenta, and BASF (Gliessman et al., 2019).

There is evidence of robust community organizational models in the Cauca food system, which is also noted as a characteristic of AFN in the Global North but is carried out through distinct ontological and cultural lenses. While AFN literature focuses on organizational models such as community supported agriculture, community gardens, and food cooperatives (Tregear, 2011; Michel-Villarreal et al., 2019), in Cauca, producer run associations, *mingas*, and bartering

networks are more common. *Mingas*, are a traditional form of communal labor originated in indigenous communities, but now practiced in all types of rural communities, which creates space for community bonding and relationship-building while carrying out agricultural activities (Muelas Aranda and Gómez Joaquín, 2006). *Mingas* along with bartering networks reflect Andean indigenous ontologies that foster a culture of nurturing and reciprocity and try to resist the complete capitalization of nature (Gonzales et al., 2010). This aspect is crucial for understanding the Cauca food system as an alternative food network as well as in other regions in the Global South.

From a political perspective, community organization among actors can be seen in the transformative agrarian movements that have occurred in the last decade in the region. In 2013, farmers in Cauca joined the largest agrarian movements in Colombia's history due to the injustices and power imbalances that were generated from the 2012 Free Trade Agreement (FTA) between Colombia and the United States, along with other impacts of the neoliberal policies of the food regime (Roa-Clavijo, 2021). The FTA was a culmination of the conventional food system, encouraging subsidized staple crops from the U.S. to enter Colombia, undermining local food systems throughout the country (Ortega García, 2018). The movement showed the capacity of farmers to effectively organize, negotiate, and communicate their experiences (Roa-Clavijo, 2021). To this day, small producers are impacted by the FTA, as noted by the participants of this study.

In this sense, AFN literature does not fully capture the struggles that producers and other actors in the food system endure in Latin America. Not only are people resisting aspects of the conventional food system that diminish social, economic, and social sustainability, they are resisting the erasure of their traditions, cultures, and identities. Globalization and westernization changed much more in Cauca than just food systems, it impacted communities and their territories. In Andean worldviews, the concept of 'territory' represents much more than a physical space with geographical borders; territory is the 'essence of life' where 'identity is revitalized' and 'cultural practices are carried out' (Autoridad Tradicional del Pueblo Kizó, 2013).

Alternative food networks aim to help connect food consumers with producers in the hope that the resocialization of consumption will drive change within the food system. Such changes are generally geared towards promoting social and environmental sustainability. However, even with benevolent intentions in rural communities in Latin America, AFN are not without their challenges, limitations, and criticisms.

5. Conclusion

At its core, the definition of AFN is a food network where actors develop processes in opposition to mainstream conventional food systems, with the objective of sustainable and just food production and provisioning (Whatmore et al., 2003; Kremen et al., 2012; Wald and Hill, 2016). In the Andean region of Cauca, the local food system can be considered an AFN that challenges the conventional food system through the preservation and implementation of traditional knowledge (including farming practices, seed saving, and food preparation), the effectiveness of grassroots organizing, subsistence farming, and unified agrarian movements against hegemonic food system powers.

For the case of the local food system of the Andean region of the department of Cauca in Colombia, this research has identified the complex socio-ecological dynamics, characterized within six themes: 1) Influence of conventional food systems and value of sustainable agricultural production, 2) Economic struggles throughout the food system, 3) Impacts of climate change and climate variability, 4) Social and political obstacles in territories, 5) Importance of self-organizing and multisectoral, intercultural cooperation, and 6) Recovery and application of traditional knowledge.

These dynamics were considered in comparison with the main concepts of AFN in the Global North. It was found that there are similarities including the importance of connections between producers and consumers, value for sustainable agriculture, and the power in community organizing. Yet fundamental differences did emerge, such as the ontological and cultural foundation of the AFN in Cauca, the difference being value-based behaviors of the North versus necessity-based behaviors of the South, as well as the underlying intersectional challenges that citizens of the Global South endure.

This research has shown that aspects of both traditional and conventional food systems coexist within the AFN in Cauca. This confirms that an AFN is not an 'all or nothing' food system, and that it can be conceptualized based on the relationships between food systems actors and their territories, as well as the historical and socio-cultural context of the geographical area, rather than typical AFN indicators such as food miles or organic certifications (Goodman et al., 2012; Sarmiento, 2016; Maticena and Corvo, 2020). Thus, a socio-ecological systems and food regime approach are helpful to conceptualize location-specific AFN, and why an AFN in Colombia is distinct from an AFN in the United States or Europe.

The field of AFN would greatly benefit from the inclusion of more diversified studies throughout the Global South. This nuanced approach towards AFN is helpful to broaden the understanding in the Global North to include other visions from the Global South towards a more integrated perspective of pluralistic ontologies, relationships between nature and humans, and recognition of historical and geo-political influences in food systems.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary materials, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee of the Water Security and Sustainable Development Hub. The patients/participants provided their written informed consent to participate in this study.

Author contributions

RM as lead author on the manuscript with support from AC. RM, JS, and SM designed and carried out workshops as well as realized data

analysis. All authors contributed to the article and approved the submitted version.

Funding

This work was supported by the Water Security and Sustainable Development Hub funded by the UK Research and Innovation's Global Challenges Research Fund (GCRF) [grant number: ES/S008179/1], as well as SHARE: Development of food and water security strategies for the economic reactivation of rural communities through the transfer of technologies and knowledge for innovation as a response to the Covid-19 emergency in Cauca, funded by the Sistema General de Regalías of the Colombian Government, Grants ID 5650.

Acknowledgments

The authors thank the participants from the municipalities of Silvia, Totoró, Cajibío, and Popayán who made this work possible, and for being a part of an ongoing process of mutual learning.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsufs.2023.1216116/full#supplementary-material>

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OPEN ACCESS

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RECEIVED 06 May 2023

ACCEPTED 20 June 2023

PUBLISHED 27 July 2023

CITATION

Verfuërth C, Sanderson Bellamy A,
Adlerova B and Dutton A (2023) Building
relationships back into the food system:
addressing food insecurity and food
well-being.
Front. Sustain. Food Syst. 7:1218299.
doi: 10.3389/fsufs.2023.1218299

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Building relationships back into the food system: addressing food insecurity and food well-being

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Introduction: Failures of the current food system sit at the core of the multitude of crises by being the root framework for both consumption choices and food production. Low-income households are disproportionately affected by these failures, impacting their food security and access to healthy and sustainable foods. Community-supported agriculture (CSA) is a bottom-up response towards an agri-food system transformation by providing an alternative food system based on agroecologically grown food that is sold locally and rooted in social values. Alongside other food citizenship movements and alternative food networks (AFN), CSAs are driven by the vision to develop a democratic, socially and economically just, and environmentally sustainable food system. Yet, low-income households are underrepresented in the CSA community.

Method: Our paper presents findings from a co-produced intervention between the research team, four CSA farms based in Wales, United Kingdom and two food aid partners that sought to identify ways to improve the accessibility of CSA memberships for food-insecure households. Thirty-eight households received a weekly veg bag for a period of 2–4 months. We interviewed 16 household members at the project start and end of the harvest season. Building on the food well-being framework, we investigate impacts of a CSA membership on food-insecure households.

Results: We found that CSA membership holistically improves food well-being, through strengthening producer-consumer relationships, increasing availability of healthy foods, helping people to care for their own and their families well-being, and building place-based food capability and literacy.

Discussion: This paper supports wider narratives that call for systematically prioritizing interventions that promote overall food well-being, which can lead to sustainable and just food systems with positive outcomes for financially excluded, food insecure households in localized AFNs.

KEYWORDS

CSA, food well-being, food insecurity, community food, co-produced intervention, food relationship

1. Introduction

What we eat and the way we produce our food greatly impacts our land, climate, biodiversity, health and well-being, and communities (Willett et al., 2019). The current food system is not only unsustainable but also increasingly inequitable, resulting in food insecurity for many people in the United Kingdom and globally. The failures of the current food system were further

highlighted during the COVID-19 and the current cost-of-living crises that amplified the risk factors associated with food insecurity and an unhealthy diet, with its biggest negative impact on already vulnerable communities (Power et al., 2020; Sanderson Bellamy et al., 2021; Patrick and Pybus, 2022).

These layered crises not only exacerbate and replicate food and health inequalities, but simultaneously fuel scholarly and practitioners' interest in Alternative Food Networks (AFN) as a response. AFNs have been for some time at the center of practice and discussion about how to make food systems more just and sustainable (Jarosz, 2008; Bos and Owen, 2016; Cerrada-Serra et al., 2018). Community gardens, farmers markets and Community Supported Agriculture (CSA) have been hailed for addressing key failures of industrialized food system by being rooted in ecological and social values (Mert-Cakal and Miele, 2022), and creating well-being benefits (Giraud et al., 2021). They have been criticized for their inaccessibility to low-income households (Vasquez et al., 2016) and potential to reproduce social inequalities (Guthman, 2011; Moragues-Faus and Marsden, 2017). This study addresses these gaps by focusing on how CSA memberships can be made more accessible to low-income and food-insecure households.

We contribute to these debates by presenting findings from a co-produced intervention between the research team, four CSA farms based in Wales, United Kingdom and two food aid partners. We aimed to identify barriers to CSA membership and participation, understand the impact of CSA membership on food-insecure households and explore means for CSAs to implement solidarity models to improve accessibility of healthy and sustainably-produced food. We explore the impact of CSA membership on food-insecure and low-income households across four dimensions influencing food-well-being, building on the food-well-being framework (Block et al., 2011; Voola et al., 2018). In addition to the four dimensions, namely (1) food availability, (2) food capability, (3) food socialization, and (4) food policy, we identified a cross-cutting theme we call food relationships. We argue that community-supported agriculture holistically improves food well-being by strengthening producer-consumer relationships, increasing physical availability of healthy foods, helping people to care for their and their families' well-being and building place-based food capability and literacy.

The remainder of this section introduces the concept of CSA, highlights inequalities in the current food system and ties these in with concepts around food citizenship and food well-being, before introducing the methodology and analysis and discussion of the present study data in the context of food well-being and through the lens of the food well-being framework by Voola et al. (2018), which further enhances our understanding of food well-being.

1.1. Community supported agriculture as a response to a broken food system

The current food system is dominated by large-scale producers, food manufacturers, and retailers well equipped to maximize calorific content and longevity of food. However, the system fails to provide nutritious, sustainable food for all (Schmidt-Traub et al., 2019). Diet-related non-communicable diseases are largely driven by a food system that encourages cheap and energy dense food choices (Branca et al., 2019). The COVID-19 pandemic further highlighted many of the weaknesses of the current dominant food system and injustices

and its detrimental effects on people's health and well-being (Shanks et al., 2020). Moreover, current trends in global food systems prevent achieving climate change goals, hence rapid and ambitious actions are needed (Clark et al., 2020). Increasingly, there have been calls for a more sustainable and equitable food system, a narrative that has been underpinned by multiple discourses around what an equitable food system could look like (Juskaite and Haug, 2023). CSA is commonly seen as one of the key alternative food networks (AFNs) that challenge the conventional food system dominated by large-scale, industrialized agriculture and globalized supply chains.

Community-supported agriculture is a bottom-up response to address key failures of the current food system by providing an alternative food system based on agroecologically produced food that is grown for the community and rooted in social values (Mert-Cakal and Miele, 2022). It is a model of agriculture that connects consumers directly with local farmers. The main idea behind CSA is that individuals or households purchase a share of a farm's produce in advance. This provides farmers with the necessary capital to grow their produce and ensures that consumers receive fresh, locally-grown produce throughout the season, often accompanied by community events and opportunities to contribute to the work on the CSA farms (Forbes and Harmon, 2008). They are commonly seen as an example of alternative food networks (Cerrada-Serra et al., 2018). Although the discussion about their emergence, definition and transformatory impact is ongoing, AFNs are usually underpinned by the following five principles: (a) transparent short supply chains, (b) organic or environment-friendly farming at smaller scale, (c) reconnecting producers and consumers through alternative routes to market, such as food co-operatives and farmers markets (Jarosz, 2008), (d) commitment to develop socially and economically just, and environmentally sustainable food systems (O'Kane, 2016), and (e) promoting citizen-consumer participation in shaping their food systems (Renting et al., 2012; Moragues-Faus and Marsden, 2017).

Community-supported agricultures play a pivotal role in food production and are a key actors in transforming the sector (Matzembacher and Meira, 2019). CSA is a unique model of agriculture that emphasizes direct relationships between farmers and consumers, shared risks and benefits, locally grown and seasonal produce, sustainable agricultural practices, and community involvement. The United Kingdom CSA Network Charter describes four principles by which to define CSAs: (1) agroecological production; (2) community investment and commitment in sharing risks, rewards and responsibilities of farming; (3) farm businesses that produce food, flowers, fibre or fuel; and (4) hyper local direct distribution of their own produce.

Alternative food networks in general have been critiqued for their potential to reproduce social inequalities (Guthman, 2011; Moragues-Faus and Marsden, 2017) or being prone to co-optation (Marsden and Sonnino, 2007; Pudup, 2008). However, we are more inclined to continue to look for 'politics of possibility' with Gibson-Graham (2006, p. xxxi) who observe that 'future possibilities become viable by virtue of already being seen to exist'. This is especially important when it comes to creating democratic, just and sustainable food systems that need fertile soil to nurture seeds of such possibilities. CSA fertilizes the soil by centering care for people and the planet in their practices (Jarosz, 2011), as well as allowing producers and consumers to express care for diverse human and more-than-human others (Cox et al., 2013). Nevertheless, working in a neoliberal food regime that

prioritizes unhealthy and unjust food by design (Guthman, 2011) makes it challenging to balance their environmental and social justice commitments (Bos and Owen, 2016). While highly motivated to contribute to their community, CSAs often lack the resources to systematically improve their reach to more diverse members of their community (e.g., low-income households; Galt et al., 2017). Therefore, access to their produce is often economically and culturally limited (Bos and Owen, 2016; Prost, 2019). This in turn contributes to inequalities in accessibility of sustainably-produced fruit and vegetables and other non-food benefits.

1.2. Underrepresentation of low-income households in CSAs

Community-supported agriculture members are demographically homogeneous with most members being affluent, highly educated, and white (Vasquez et al., 2016). Accessibility of CSA membership is multi-faceted, often correlated with household income. Research in the United States suggests that as well as income barriers, social, cultural and identity factors may constitute additional obstacles to membership that CSAs could address (Galt et al., 2017). CSA programs have been associated with positive impacts on food consumption and health benefits as well as an increased sense of belonging and community building. This means that large parts of the population are excluded from potential CSA membership benefits. Lower-income households and those affected by food insecurity would particularly benefit from these positive impacts. A recent study conducted with a poor community in the US found that a substituted CSA program improved diet behaviors, food security and overall health (Izumi et al., 2020). While there has been some research into potential benefits of CSA memberships for low-income households (e.g., Berkowitz et al., 2019; Izumi et al., 2020), these programs tend to be subsidized by charities or health initiatives.

The social benefits of local AFNs have been recognized elsewhere (Diekmann et al., 2020). As such, we argue that focusing on building relationships back into the food system and connecting households to food producers, as is achieved by the CSA model, better addresses food well-being, leading to corresponding changes in dietary behavior. Focusing on the community scale means that the relevant place-based approach is incorporated in how the community may choose to redress food insecurity and build solidarity models. By focusing systematically on how these interventions foster overall food well-being, rather than just accessibility to food or better nutrition, we can move towards more sustainable and just food systems that create positive outcomes for food-insecure households who are too often financially excluded from participating in localized AFNs.

Community-supported agriculture diets tend to adhere more closely to the recommendations of the EAT–Lancet Commission on healthy diets from sustainable food systems (Willett et al., 2019; Mills et al., 2021; Sanderson Bellamy et al., 2023). There has been some criticism of the EAT–Lancet Commission diet for not meeting the need for micronutrients (Beal et al., 2023) and for not assessing the affordability of the recommended diet (Hirvonen et al., 2020). CSA diets tend to be more varied and of higher quality (Minaker et al., 2014), which is likely to provide more micronutrients. However, CSA diets tend to not be tailored to meet affordability and accessibility needs. Households that decide to join a CSA are usually motivated to make a

change to their diet, most often because of either health or sustainability reasons (Sanderson Bellamy et al., 2021). This, together with their higher average income, raises practical questions for both CSA farmers and for policymakers about how to scale-out impact to a wider cross-section of society. However, with even the Eatwell diet (United Kingdom public health guide for healthy diet) being increasingly unaffordable for a growing percentage of the population, achieving sustainable and healthy diets for all will not be possible without significant policy shifts.

1.3. Food citizenship and food well-being

Accessibility to CSA memberships for low-income households is also relevant to debates on food citizenship and food well-being. In the wider context of the food democracy movement, a term coined in the 1990's (Lang, 1998), food citizenship has emerged as a concept that rethinks consumers as active citizens who participate in shaping the food system (Renting et al., 2012). Through creating spaces for building up individual and collective agency to determine values in the food system, it aims to shift power relations to establish justice and fairness (Bornemann and Weiland, 2019). Food citizenship is often promoted through involvement in community-based food projects, which have been associated with improved well-being. For instance, a study by Lam et al. (2019) showed that exposure to school gardens increased youth well-being. More specifically, the school gardens were associated with relaxation, connectedness to growing food and the people involved, improved self-esteem, and other dimensions linked to well-being. Another study found a strong link between participation in local food projects with increased well-being (Bharucha et al., 2020). The authors identify well-being as a co-benefit of local food initiatives beyond the mental and physical benefits of growing food. Blake (2019) has identified similar food-plus benefits - new skills and increased individual and community resilience through relationship building, acquired by people participating in and running community food-security initiatives. These non-food co-benefits are a real asset in times of both a food and mental health crisis. Low-income households have been disproportionately affected by the COVID-19 pandemic and cost-of-living crisis, with detrimental effects on people's well-being (Power et al., 2020; Patrick and Pybus, 2022). Hence, CSAs have the potential to counter some of these effects by providing healthier food and mental health benefits. More broadly, the underrepresentation of low-income households in CSAs impedes aims to democratize and redistribute power imbalances within the food system (Juskaitė and Haug, 2023).

Food well-being is a multidimensional concept that combines perspectives from food security, food sovereignty and individual and social well-being (Gartaula et al., 2017). In a broader sense, it can be defined as “a positive psychological, physical, emotional, and social relationship with food at both the individual and societal levels” (Block et al., 2011, p. 6). As such, food well-being is situated in the wider context of food availability and food (in)security and is a direct outcome experienced by individuals from food consumption and their relationship with the food (Jayashankar and Raju, 2020). Promoting a more holistic approach to food overcomes the shortcomings of any unidimensional understanding, for example food as only health (Block et al., 2011) or as secure production and supply (Gartaula et al., 2017). Voola et al. (2018) emphasized the importance of addressing not only nutritional needs but also factors such as food access, food safety, and the social and emotional aspects of eating when considering food well-being.

Food well-being has been associated with physical health, positive emotions, and more generally with life satisfaction (Ares et al., 2015). Increasingly, evidence has highlighted the important relationship between food and subjective well-being. Apaolaza et al. (2018) demonstrates that organic food consumption is linked to increased well-being, especially when individuals hold strong health beliefs. In the context of low-income consumers, food well-being has also been associated with social cohesion and networks as underpinning factors of perceived food availability (Jayashankar and Raju, 2020). As highlighted by Block et al. (2011) in their conceptualization of food well-being, a key component is food availability which tends to be compromised for low-income and food-insecure households, especially with regards to healthy and fresh foods. Common barriers to food availability include so called 'food deserts' (i.e., areas with limited availability of affordable, fresh produce), transport barriers, reliance on packaged and processed foods (e.g., due to limited storing options and due to being a source of cheap calories) and psychological distress caused by hunger (Bublitz et al., 2019).

Scholars to date have used food well-being to explore well-being as a perceived outcome (Jaeger et al., 2022) or to assess different factors and their configurations that contribute to or limit food well-being. The latter particularly resonates in scholarship investigating its relationship to food injustices such as community response to food insecurity in the United Kingdom (Parsons et al., 2021) and in the United States (Bublitz et al., 2019), food insecurity amongst farmers in Nepal (Gartaula et al., 2017) or gendered experiences of food insecurity in India (Voola et al., 2018).

Although there is not yet a consensus over the definition of food well-being (Jaeger et al., 2022), scholars have widely used Block et al.'s (2011) five dimensions of food well-being: food socialization, food availability, food literacy, food marketing and food policy. In their research of gendered experiences of food insecurity in India, Voola et al. (2018) developed the framework with a specific focus on food well-being in poverty, and paid attention to four dimensions: food availability (the production of food and its accessibility), food socialization (the socio-cultural influences and relevance of food, with a focus on family setting), food capability (conceptual, procedural and functional knowledge about food and nutrition), and food policy (from macro-level of agriculture, technology and welfare to micro-level of food safety and labelling). They enrich Block et al.'s (2011) framework with a feminist lens, shedding light on the role of families and especially women in shaping food well-being, and by developing the food literacy dimension into food capability. This dimension foregrounds informal and experiential learning in increasing food proficiency and literacy. Food literacy is in itself a multidimensional concept that includes conceptual and declarative knowledge (gaining information about foodstuffs, for example nutrition), procedural knowledge (using the information in food decision-making) and the ability, opportunity and motivation to use the knowledge in practice, for example in food preparation (Block et al., 2011). Voola et al.'s (2018) framework enhances our understanding of food well-being. More recently, scholars have started to make connections between food literacy and food citizenship, proposing wider literacy about the food system to be a condition for nurturing food citizenship (Meyer et al., 2021; Rowat et al., 2021).

Given the framework's focus on food well-being in poverty, centering familial relations and experiential learning, we found it useful as a framework for our exploration of the role of CSA in driving food well-being of food-insecure households in the United Kingdom. It offers a two-prong approach for our investigation: firstly, it enables

us to consider more holistic outcomes of our intervention, rather than just food security and health, i.e., to what extent CSA membership contributes to people's individual and collective food well-being? Secondly, it facilitates the exploration of the different factors that influence well-being. Its foregrounding of relations enables us to consider how CSAs and other AFNs are uniquely placed to impact not just food security, but broader food well-being. Given that most prior research has focused on consumption factors (Scott and Vallen, 2019), in this paper we enrich the discussion by concentrating on how improving accessibility to CSAs simultaneously tackles other factors that holistically contributes to food well-being. CSAs also provide an opportunity to consider how food well-being can better connect with broader questions of societal and planetary well-being such as environmental, social and economic sustainability of food systems and be a key component for a transformed food system.

2. Methodology

2.1. Community-supported agriculture project partners

This research has been co-produced with four CSAs and two food aid organizations. Data were collected via in-depth interviews with food-insecure CSA members to understand how they interact with CSAs and benefits arising from those interactions as well as barriers to realizing additional benefits of CSA membership. In total, 38 households received a weekly veg bag for a period of 2–4 months of which 16 participated in interviews before receiving the veg bag and towards the end of the growing season.

The chosen farms were geographically spread across Wales (see also Figure 1) and expressed an interest in exploring solidarity models for making their vegetables accessible to food-insecure households. These farms were:

- Ash and Elm Horticulture, Llanidloes, Wales (5 acres).
- Glasbren CSA, Bancyfelin, Carmarthen, Wales (1.5 acres).
- Henbant CSA, Clynngofawr, Caernarfon, Wales (75 acres).
- Slade Farm Organics, St Brides Major, Wales (5 acres).

Our farm partners were encouraged to partner with local food charities to help support their work with food-insecure households. The two charity partners who participated in the project were:

- Splice Child and Family Project, Bridgend: offer a family-centered service which aims to support parents/carers to play and learn along with their children which helps to develop confidence and self-esteem. Splice provides emotional and practical support to families.
- Siop Griffiths, Penygroes, Gwynedd is a Community Benefit Society run for the benefit of the whole community.

2.2. Procedure: free CSA membership, participant recruitment and interviews

Most participants were female and tended to be young to middle age (see Table 1). Most participants had a below

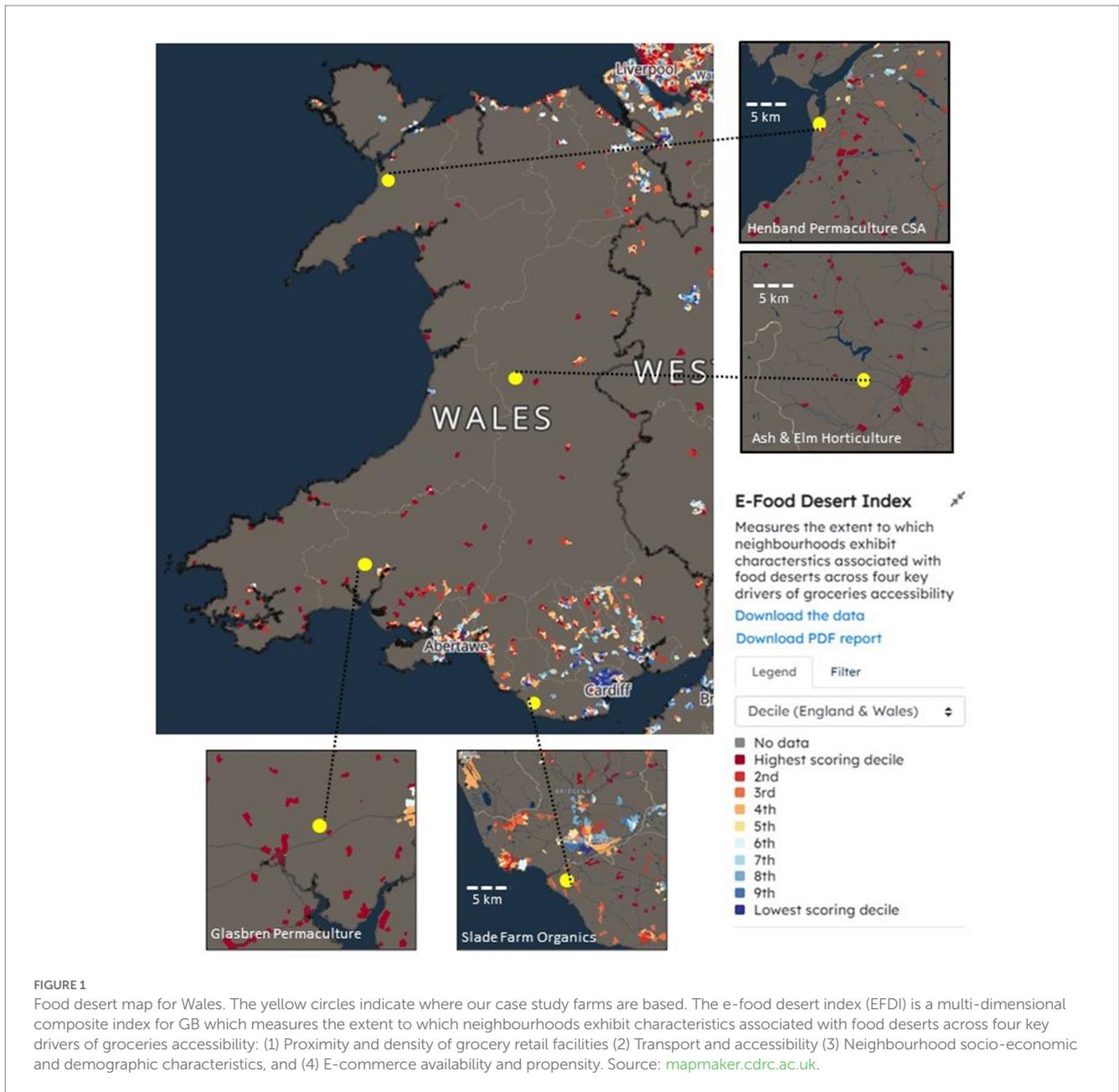


FIGURE 1
 Food desert map for Wales. The yellow circles indicate where our case study farms are based. The e-food desert index (EFDI) is a multi-dimensional composite index for GB which measures the extent to which neighbourhoods exhibit characteristics associated with food deserts across four key drivers of groceries accessibility: (1) Proximity and density of grocery retail facilities (2) Transport and accessibility (3) Neighbourhood socio-economic and demographic characteristics, and (4) E-commerce availability and propensity. Source: mapmaker.cdrc.ac.uk.

United Kingdom median household income¹ and many experienced food insecurity expressed in either a subjective perception of food insecurity during the interviews and/or through reporting of skipping meals for financial reasons. To measure food insecurity, we asked the following four questions: In the last month have you or anyone else in your household done any of the following because you could not afford or access food: (a) found it difficult to afford to buy your weekly shop? (b) had smaller meals than usual or skipped meals? (c) been hungry but not eaten? (d) not eaten for a whole day (Figure 2)? These

questions were adapted from USDA National Food Security Survey (Coleman-Jensen et al., 2021).

Participants were recruited either through the CSA partners or local food aid charities that supported low-income and food-insecure households. Participants were selected based on household income and knowledge of the presence of food insecurity through the food aid charities. Participants received an information sheet with an invitation to take part in the project through our project partners. They were incentivized to join the study by receiving free weekly vegetable bags from the host CSA for the duration of the harvest period (July to November/December 2021). Participants in the project became full members of the CSA veg bag scheme for 2–4 months; the length of the project was limited due to the length of the harvest season, after which the farm partners did not provide veg bags. They received the same information from the CSA as other members, pertaining to the foods

¹ Office for National Statistics: Median household disposable income in the UK was £31,400 in financial year ending (FYE) 2021.

TABLE 1 Participant information.

ID	Start veg box	End veg box	Age	Gender	Number of household members	Income	Farm
Ann	24-Jun-2021	03-Dec-2021	39	Female	6	10,000–20,000 per year after taxes	Slade Farm
Sue	24-Jun-2021	29-Nov-2021	34	Female	3	10,000–20,000 per year after taxes	Slade Farm
Laura	04-Jul-2021	08-Nov-2021	37	Female	3	10,000–20,000 per year after taxes	Henbant
Joanne	04-Jul-2021	17-Dec-2021	40	Female	4	<10,000 per year after taxes	Henbant
Sarah	02-Jul-2021	19-Nov-2021	32	Female	4	30,001–40,000 per year after taxes	Henbant
Rhiannon	02-Jul-2021	18-Nov-2021	33	Female	5	>50,000 per year after taxes	Henbant
Zara	05-Jul-2021	09-Nov-2021	22	Female	3	10,000–20,000 per year after taxes	Henbant
Emma	23-Sep-2021	16-Dec-2021	58	Female	4	20,000–30,000 per year after taxes	Ash & Elm
Grace	10-Aug-2021	15-Dec-2021	33	Female	4	10,000–20,000 per year after taxes	Ash & Elm
Ella		13-Dec-2021	36	Female	2	<10,000 per year after taxes	Ash & Elm
Freya	18-Aug-2021	15-Dec-2021	59	Female	2	<10,000 per year after taxes	Ash & Elm
Imogen	30-Sep-2021	01-Dec-2021	21	Female	5	10,000–20,000 per year after taxes	Ash & Elm
Claire	13-Aug-2021	16-Nov-2021	37	Male	3	<10,000 per year after taxes	Glasbren
Amy	08-Oct-2021	26-Nov-2021	44	Female	2	10,000–20,000 per year after taxes	Glasbren
Carys	07-Oct-2021	29-Oct-2021	25	Female	3	does not know, her husband manages money	Glasbren
Erin	11-Oct-2021	22-Nov-2021	62	Female	1	<10,000 per year after taxes	Glasbren

The names have been changed to guarantee participants' anonymity.

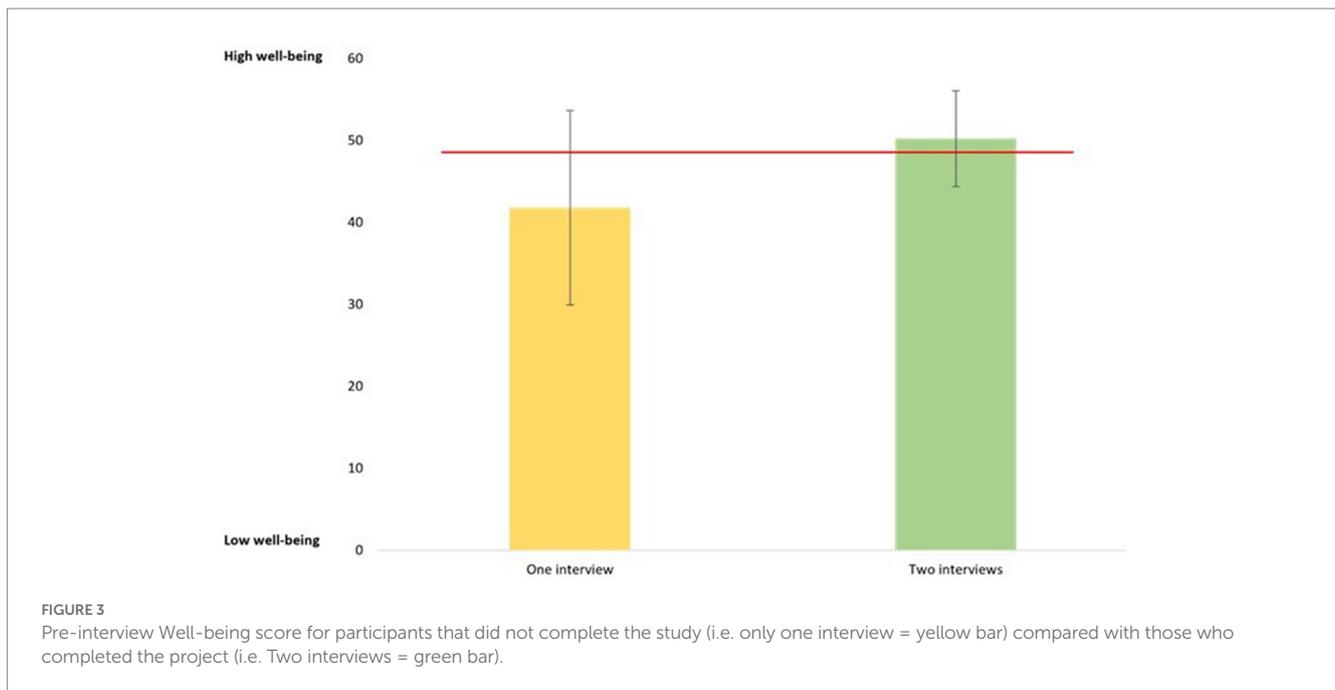


that they were growing, recipes for how to use the vegetables, opportunities to visit the farm and volunteer or attend other events that the CSAs hosted during the season. We encouraged participants to get involved as much as they wished.

To assess the impact of the CSA membership, interviews were carried out pre and post project participation by phone. The interviews included questions about participants' diet and consumption patterns, experiences of the membership and its impacts and three proposed solidarity models for future use. Most interview questions were open-ended; however, a few interview questions were closed and covered areas such as demographics, food insecurity and well-being. The Warwick-Edinburgh Mental well-being Scale was used and measures mental well-being with 14 items that relate to an individual's perceived mental well-being in the prior two weeks (Stewart-Brown and Janmohamed, 2008). In total, 16

participants representing 16 households took part in both the pre and post veg-bag interviews (Table 1). Initially, 44 households signed up, of which 38 took part in the initial interview before receiving the veg bag. This means that the dropout rate was relatively high. We compared some key indicators between the drop-out sample and the participants who completed both interviews and found some relevant differences, for instance, lower well-being of dropout participants in comparison to those who completed two interviews (see Figure 3).

In the workshops with our project partners, we reflected on potential barriers these households may have experienced that led to a lower participation rate in the post-interview. These included the interview timings (particularly busy and stressful time before Christmas) and also higher non-participation rates in areas not partnered up with a food aid organization. The initial 44 households



were chosen by our food aid partners and the participating farms. The number of households was determined by multiple factors including limited amount of funding, farm capacity to generate additional veg bags and accessibility to households that were willing to participate. Conversations with our food aid partners revealed that, while there were many low-income households that would qualify to take part, the willingness and capacity for many of these households was limited – often linked to mental health issues and distrust in institutions. As has been noted elsewhere, severe food insecurity is linked to extreme chronic stress (Smith et al., 2023), which reduced potential participants' capacity to take part.

In addition to the interview data represented here, we conducted a workshop with the project partners after the harvest season. The farms and food aid charities discussed their experiences with the projects and various activities and efforts to build a sustainable solidarity model for continuing to provide veg bags for food-insecure households going forwards. The study methods were approved by the University of the West of England's Ethics Committee (reference number: HAS.21.07.166, Ref: JW/lt) and Cardiff University School of Psychology (reference number: EC.22.01.18.6505).

2.3. Analysis

We recorded and transcribed the interviews and anonymized the responses. For the data analysis, we applied a coding procedure derived from Braun and Clarke (2006). This involved filing all the data (using the software package NVivo) and identifying themes that existed within the data. Initially we revisited the research questions and coded any data that was relevant to them. For example, any data that mentioned interacting with the farmer or CSA community was coded as such: i.e., comments about farm visits were coded as 'connection with the CSA'. The second stage of the coding involved identifying 'in-vivo' themes that were present

in the data and coding them accordingly. These were strong themes that emerged from the data, but were not necessarily considered before the study began, either in our research questions or previous literature. One such theme was motivation for and enjoyment of cooking as an expected benefit of joining the scheme. The thematic analysis was carried out iteratively until no new themes arose, data saturation was reached (Fusch and Ness, 2015) and the definitive findings emerged. Below we describe our findings. We start with an overview of participants characteristics and then turn to exploring the impact of the CSA membership through the lens of food well-being.

In this paper we argue that CSA membership for low-income households has great potential to improve food well-being. To assess the impact of CSA membership, we used a well-being scale (see next section) and a measure of food security as indicators for food well-being. Additionally, and building on the food-well-being framework by Voola et al. (2018), we analyzed the qualitative data across four key dimensions, namely (1) food availability, (2) food capability, (3) food socialization, and (4) food policy.

3. Findings and discussion

3.1. Food well-being

Food security is a fundamental prerequisite for food well-being because it refers to the ability of all people, at all times, to have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for a healthy and active life (FAO, 2006). The sample in this study has a high prevalence of experienced food insecurity. Assessing an improvement of food security is therefore important to assess food well-being more generally. Although the research design did not allow to assess nutritional benefits, this was explored by an associated study (Sanderson Bellamy et al., 2023).

We used four questions to assess food insecurity. Our data indicates that self-reported measures of food insecurity decreased over the period during which participants received a weekly veg bag (see Figure 4). This indicates that the CSA membership had a positive effect on food insecurity by reducing it, although some still experienced hunger and skipped meals. Although the CSA membership provides access to organic vegetables, more foodstuff is needed for a sufficient diet, which might be a limitation of CSA memberships as the only additional source of food.

We used a general well-being scale (Stewart-Brown and Janmohamed, 2008) as another indicator to assess food well-being. Our results also show that well-being improved over the same period (Figure 3). Participants were asked to indicate what best described their experience over the last 2 weeks for statement like “I’ve been feeling optimistic about the future” (note: 5-point Likert scale with 0 = None of the time and 5 = All of the time). The difference (0.29 mean difference, 95% CI [0.458; 0.122]) was statistically significant, $t(15) = -3.677, p < 0.05$ with participants reporting on average lower well-being scores before receiving the veg bag ($M = 3.64, SD = 0.359$) compared to after receiving the veg bag ($M = 3.938, SD = 0.406$).

The level of food insecurity was compared for the two groups and found that the group that had pre-interviews only, had significantly higher levels of food insecurity ($p = 0.046$). Figure 5 shows the answers to the food insecurity questions, both groups equally found it difficult to afford their weekly shop, participants with pre-interviews only were frequently having smaller meals or skipped meals, or did not eat for a whole day, than those who completed both interviews. The level of food insecurity was measured between the two groups as seen in Figure 3. Participants that completed the pre-interviews only had higher levels of severe food security, determined by either answering ‘yes’ to all four questions or answering ‘yes’ to not eating for a whole day.

Well-being is a multifaceted concept and is the outcome of many processes. Our findings indicate that CSA membership for low-income and food-insecure households does improve two components of food well-being, namely food security and general well-being. Previous research has demonstrated that food insecurity has a significant effect on the likelihood of being stressed or depressed (Pourmotabbed et al., 2020). We show that these effects can be reduced through CSA membership.

In the next section we explore the dimensions of food well-being further by analyzing our qualitative data building on Voola et al.’s (2018) food-well-being framework. In addition to the four dimensions identified by Voola, namely (1) food availability, (2) food capability,

(3) food socialization, and (4) food policy, we found a fifth cross-cutting dimension that is particularly relevant in the context of CSAs, which is food relationship (see Figure 6).

3.2. Food availability

All collaborating CSA farms were predominantly located in so-called “E-Food deserts” - geographical areas that exhibit especially low accessibility to groceries. The key factors considered in the E-Food-Desert Index developed by Newing et al. (2022) and used as an indicator in this paper include (1) Retail opportunities (i.e., distances to nearest large grocery store), (2) Transport and accessibility (i.e., travel time to nearest grocery store by car and on foot), (3) Neighborhood

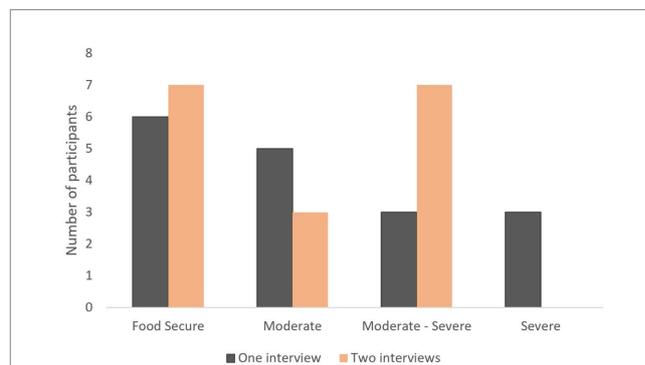


FIGURE 5 Number of participants that experience food insecurity. Here the comparison is made between the participants who completed one interview and then dropped out and those who completed two interviews.

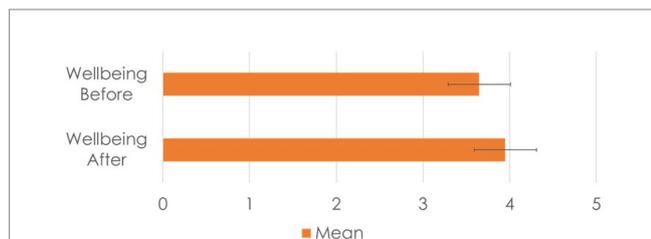


FIGURE 4 Results of Warwick-Edinburgh well-being scale. Example question included: “I’ve been feeling optimistic about the future” and “I’ve been thinking clearly”. 1 = None of the time, 2 = Rarely, 3 = Some of the time, 4 = Often, 5 = All of the time.

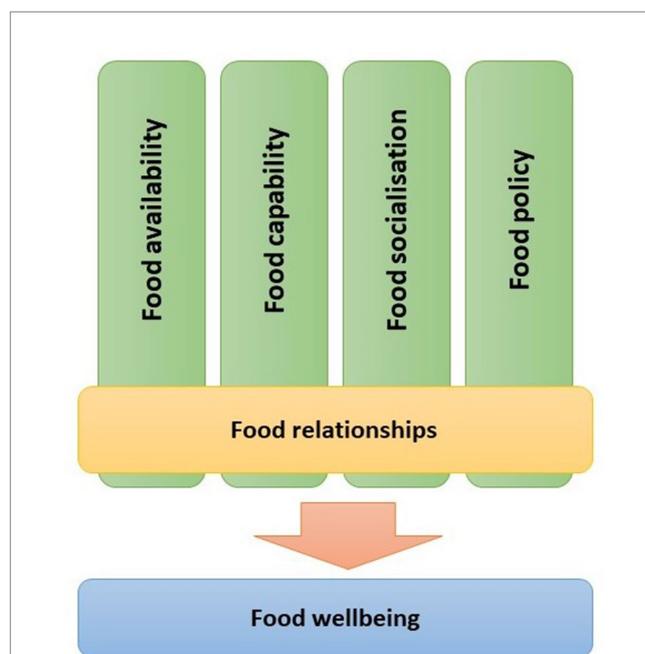


FIGURE 6 Revised food well-being framework that integrates the dimension of food relationship for food well-being.

socio-economic and demographic indicators (i.e., income deprivation, car ownership, pensioner in household), and (4) Online groceries (i.e., propensity to shop online and availability of home delivery). The index highlights inequalities in access to groceries, especially to fresh vegetables, which are often more expensive and limited in very small local stores. Rural Wales, where all four case studies took place, is characterized by remote and rural communities with poor access to both physical and online grocery stores (see Figure 1).

This was corroborated by research participants who reported the desire to access more fresh produce locally from small producers, but noted financial inaccessibility, physical availability or transport as main barriers to achieve that:

Interviewer: “What would the ideal food purchasing look like? So if you could just imagine anything?” Emma: “I think it would be all locally, or most of it locally sourced. Fresh and well not every day but you know every few days, I wouldn't have to do a big shop in one go. As much fresh stuff as possible rather than tinned stuff - more fresh stuff rather than processed.” Interviewer: “And what do you think are the barriers to achieving this at the moment?” Emma: “Cost. And to certain extent availability [pause] and time to a certain extent as well, it's great, you know, you go around the bakers and the butcher's and the veg shop and things but it does take more time than just getting everything [in one place].” Emma, 58, household of three.

The CSA membership improved different aspects of people's food availability, including physical availability, economic accessibility, quantity, quality and variety. Firstly, it made local and seasonal fruit and vegetables more available. The vast majority of participants reported a positive impact of receiving the veg bag on their diet, mostly focused on boosting their vegetable consumption. There was a statistically insignificant increase in people's intake from on average 2.7 portions of fruit and veg reported before being a member, to 3.2 at the end of the project. Some participants also reported that receiving a free veg bag also made finances available for buying other food. This indirectly increased accessibility of other food, as well as reduced concerns about exceeding weekly budget and thus improved mental well-being. This is important because as prior research shows, households who are food insecure consume less fruit and vegetables than households who are food secure (Maguire and Monsivais, 2015). This discrepancy is exacerbated by a current cost-of-living crisis when in the last three months of 2022, the total amount of vegetables purchased in the UK decreased by 8% compared to the same period in 2021, and nearly 16% compared to 2020 (Veg Power, 2023).

For many participants, improving the quality and quantity of vegetables in their diet was a key contribution of the scheme and they valued the diversity the veg bag brought every week, allowing them to be more 'adventurous' (Joanne, 40) or 'experimental' (Erin, 62) in cooking:

“To be fair, it's encouraged the children to, obviously, eat more veg, and they've been excited to see what comes on Thursday, because in the veg bag we don't obviously get to choose what we've got in there, it's literally what is available at that time. So there's some things that we wouldn't usually go and purchase in the shop or ... or, you know, in the local supermarket or anything, so they've been really excited to try new things and stuff, so it's been really encouraging to see them get excited, and they've wanted to come

and volunteer as well down at Slade Farm, which we have done.” Ann, 39, household of six.

As the participant highlights, receiving a seasonal veg bag without the choice of what goes in it exposed the whole family to new kinds of vegetables they would not usually eat. This was especially important for families with children, where a common coping mechanism with food insecurity is limiting purchases of food that risks not being eaten. Therefore, families are less likely to experiment and buy new foodstuffs that may not be liked by their children and potentially wasted (Burns et al., 2013). In contrast, being a member of a CSA scheme allowed families to try new varieties of produce and ways of cooking in a low-risk environment. As the participant suggests, the learning and acceptance of new foodstuffs by her family was also supported by visiting and volunteering at the farm.

However, for a variety of reasons that included personal and familial preferences or too big a quantity, approximately half of participants were not able to eat all vegetables included in their weekly bag. This did not necessarily lead to increased food waste as surplus food was often distributed to extended family members and neighbors, and so further improved social relationships with and through food. Nine participants were explicitly concerned about wasting the produce; it is therefore important to recognize that this may have been a contributing factor to the high participant drop-out rate in the research study.

3.3. Food capability

The relational experimentation through embodied experience of food is an important building block for people's food capability (Voola et al., 2018). This dimension foregrounds informal and experiential learning in increasing food proficiency and literacy. Food literacy is in itself a multidimensional concept that includes conceptual and declarative knowledge (gaining information about foodstuffs, for example nutrition), procedural knowledge (using the information in food decision-making) and the ability, opportunity and motivation to use the knowledge in practice, for example in food preparation (Block et al., 2011).

The prevalent discourses of food literacy scholarship focus on the need to increase people's knowledge about nutrition and food to promote healthier food choices (Scott and Vallen, 2019). Similar emphasis on 'becoming knowledgeable' about food and food systems is also highlighted in food citizenship literature (Renting et al., 2012). This educational emphasis positions consumers/citizens as somehow deficient, presuming lack of conceptual or procedural knowledge. We'd like to offer a slightly different perspective on the role of veg bags in our participants' food literacy journey. Even if the bags exposed participants to new varieties of vegetables, cooking practices and connections in the community, we do not endeavor to present CSA membership as a solution to the *lack* of their knowledge. Indeed, given that participation in the veg bag scheme and our research was voluntary and self-selected, the majority of participants warmly anticipated numerous ways they and their families would benefit from being part of the CSA community, including

“trying a variety of different veg” Rhiannon, 33, household of five.

“trying new things, new recipes” Grace, 33, household of four.

“make more healthier options on the home cook meals” Joanne, 40, household of four.

These motivations for joining the scheme are conditioned by pre-existing knowledge and interest in vegetables, food and healthy cooking, which the membership enables further exploration and expansion of:

“I guess, [I’d like] to try a variety of different veg. You know, you go into a supermarket buying the same things for the same meal. So in a way, to try and find, well I heard there will be recipes as well, you know, I’m all for that, because cooking is my speciality.” Rhiannon, 33, household of five.

Majority of participants also reported increased confidence in purchasing and preparing fresh vegetables.

“We were thinking about doing it before, but we didn’t have enough knowledge to be able to do it, and since we have started the veg bag and volunteering at Slade, we’ve now found ... we’ve now got some... a bit of confidence to be able to do it. [...] we’ve just... we’ve just started with, you know, the simple things, like I say, potatoes, tomatoes and stuff like that, so... and it’s fun for the kids.” Ann, 39, household of six.

Rather than filling empty vessels, the CSA membership built on and developed people’s food capabilities in two distinct ways. Firstly, the exposure to new varieties of local and seasonal vegetables. The diversity of vegetables grown on CSAs means that members receive vegetables (and varieties of vegetables) not typically found in supermarkets. The more unusual vegetables were often the topic of conversations on Facebook and WhatsApp groups supporting CSA members. For example this post on Facebook (accompanied by a photo of a celeriac), “It’s not the most handsome veg, but it’s very tasty and very versatile. Attached is a link for how to cook celeriac. Enjoy! We’d love to hear how you cooked yours.”

As the above post illustrates, exposure to new vegetables was often accompanied with information about ways to cook the vegetable and recipes to encourage development of new cooking skills. The information was circulated through various media, including physical recipe cards and newsletters in the veg bags and digitally on social media. The latter went beyond the two-way relationship between a consumer and a producer and enabled the members to share recipes, cooking tips and information between each other. The recipes and information about how the produce was grown were key in helping people with food utilization, as explained by a participant receiving vegetables from Glasbren:

“Yes, I think different recipes as well. And also, you know with the... there’s this insert in the box always, and I love it when they do... you know, when there’s a little suggestion of what to do with the vegetables? Because you know, most people have got... well, I don’t know most people [...] myself, but you know, it’s usually certain vegetables you prepare in a certain way, and it’s easy to go to that same way of preparing that particular – or using – that particular vegetable, so there’s nice to have a simple suggestion to do it otherwise like for instance, leeks, there were leeks in the box, and I thought ‘Oh, gosh, I’m not a big fan of leeks. I like leek and

tomato and leek and potato soup, but I ... I usually don’t buy leeks. And there was a suggestion on ... in one of the inserts of the box just to have some you know, in the frying pan. Put some oil or butter in it, and you know, do some sliced leek and then with garlic. And it was just like the most amazing thing ever. I ... ‘Why haven’t I? ... It’s so simple!’ It was so delicious.” Erin, 62, household of one.

The routine, or ‘certain way to prepare vegetables’ she describes, was echoed across different interviews where participants reflected on how the membership gave them space and suggestions about how to experience vegetables differently. Many consumer-citizens reflected on the deliciousness and different taste of fresh produce from the veg bags. This sensory experience was important in building people’s food capabilities especially in connection to foodstuffs that were previously disliked. Children, who previously were not interested in vegetables, expressed enthusiasm and curiosity about the contents of the weekly veg bags delivered to their homes. Unlike an Instagram post, a recipe in a supermarket magazine or a Governmental 5-a-day campaign, CSA membership intersects all three dimensions of literacy as it makes both the knowledge and vegetables available in one package. It enables them to learn holistically about vegetables from inside out, viscerally, as demonstrated by the participant above.

Secondly, the scheme has helped participants to build on knowledge of their local food system, in two parts. First, it enhanced people’s awareness of seasonally grown vegetables: while many participants had a general knowledge about seasonality, participation in the CSA created more awareness about the particularities of seasonality, including the improved quality of taste of vegetables produced in season and picked at the height of maturity.

“Just because I now ... I now know what to do with it, I now know, you know ... it’s a lot fresher if you buy it, like sort of grown and not in a shop. They do taste different as well, they do taste nicer.” Laura, 37, household of three.

Like others, the participant here highlights the sensory difference of the produce she experienced as a member of the scheme, noticing the ‘nicer taste’. Secondly, participating in communications with CSA farm managers and members raised participants’ awareness of various issues related to the sustainability of the food system. In follow up interviews they expressed concerns about the economic, social and environmental sustainability of food production, especially in connection to over-reliance on imported produce, and the capacity of the local small farmers to meet the increasing demand.

Importantly, some participants also mentioned applying new knowledge outside the scheme when given the opportunity, for example

“looking at more organic veg in the supermarket” Rhiannon, 22, household of five.

“fitting more vegetables in my shopping” Joanne, 40, household of four.

“trying not to buy any vegetables that are not from the UK” Emma, 58, household of four.

These quotes demonstrate the transition that participants experienced from being a food consumer to being a food citizen. Participants engaged with exercising choices that better reflected their values. As a CSA member, they could participate in building the architecture of choice as opposed to being limited by the choices permitted by the architecture.

3.4. Food socialization

Family played an important role for participants' motivation to take part in the study and receive a weekly veg bag:

“Well, I guess having the extra things to bulk up the slow cooker with really, you know, if push comes to shove that what's great with veg, you can just all bung it in with a sauce. So it's having more profits like that can well how, and also, it's like I said before, trying to have a change and also, you know, getting kids to eat something possibly that I haven't bought before. So yeah, but it will help definitely.” Rhiannon, 22, household of five.

Participants saw it as an opportunity not only to help with the weekly food shop, but to improve the level of health and nutrition in family meals by having a wider variety of fresh vegetables and trying new recipes. There were also some participants who were interested in teaching children about where food comes from and how it is prepared. In this way the veg bags enabled participants to express care for their family, their health and well-being (Cox et al., 2013). To some extent it also eased the gendered burden of feeding and caring for one's family. When discussing the impact the veg bag had on her family's diet, one participant said:

Zara: “I've been able to get more healthy foods inside my family. It's made it [the diet] healthier.” Interviewer: “Okay. So, how so?” Zara: “I was able to cram more veggies, even if they were hidden, into different meals.” Zara, 22, household of three.

Research demonstrates that more family meals are associated with healthy eating in young people: increased consumption of fruits and vegetables and decreased consumption of fast food and takeouts (Neumark-Sztainer et al., 2003; Walton et al., 2018). However, we know that cooking family meals also represented a challenge for some participants (n = 11). These challenges included negotiating different taste preferences, particularly among younger children, lack of inspiration and risk adversity to cooking a meal that may not be consumed because of taste preferences. As a result, prior to receiving a weekly veg bag, many families used a limited range of recipes and vegetables in meal preparation. After joining the schemes, seven participants suggested that receiving a veg bag helped them with the above challenges; that they felt more inspired to cook and other people (especially children) wanted to be involved in the process of food preparation. Family members expressed enthusiasm at seeing what was in the veg bag, cooking it and trying it. Some of this may be due to the surprise element of receiving vegetables that are ready to be harvested, instead of picking vegetables based on pre-defined preferences or meal plan. A number of participants have likened it to receiving a gift, like for Christmas:

“Because you never quite know what's going to be in there, so when it comes, it's quite exciting to see what's in it, and you have to like plan for like lots of meals around, so I'm looking for new recipes, and yeah, sort of like what can we do with this, you know, celeriac or whatever, swede or whatever it happens to be? What can we do with that, sort of vegetables perhaps that I wouldn't normally consider buying? Yeah, I've had some really great things to do.” Emma, 58, household of four.

For some participants, the surprise element was not always positive, as they received vegetables that the family did not like, and were worried about wasting it. Rather than preparing something new, they chose to give these vegetables to others, such as extended family members or neighbors. This sharing of vegetables also created new opportunities to share learning and information about the farms where the vegetables came from.

The lack of choice presented a double-edged sword for participants - excitement and joy from a variety of vegetables on one hand, and concern about wasting it on the other if it did not meet their various needs:

“At one point, I texted the woman, because I ... it was so much, I couldn't at time go through it, and I don't like to waste, because I used to give them to other people because there were just loads in the box.” Rhiannon, 33, household of five.

Therefore, a common recommendation for the scheme improvement was to increase its flexibility and choice of what goes into the veg bags. Participants proposed different sizes of bags, variety of frequencies (alternate weeks as opposed to every week) and being able to tailor the content to their and their family needs. The inability to choose was listed as a second barrier to joining other schemes at reduced rate besides the price itself the inability to choose presented a barrier for joining hypothetical future schemes at reduced rate:

Interviewer: “What if it was offered at a reduced rate?” Joanne: “Possibly not.” Interviewer: “Okay. Any particular reason?” Joanne: “I just would find to be sort of not knowing what was in it more difficult to budget and factor into my own shopping and to being [inaudible] one day of the week I ... I would prefer to potentially spread out my shops if ... if it was free, I wouldn't object to that. But if it was being purchased, then I don't see it as being convenient for me.” Joanne, 40, household of four.

The balance in building more long-term democratic and sustainable food systems needs and short-term choices available to people currently need to be considered in any future schemes aiming to improve social injustices and focusing specifically on low-income households.

3.5. Food relationships

In terms of food socialization, most prior research has focused on either a family on one end as a key social and cultural site influencing the relationship between food and well-being (Block et al., 2011; Voola et al., 2018) or on the other end broader issues of ethnicity, social class and cultures - especially in relation to media and marketing - have

been shaping people's food well-being (Scott and Vallen, 2019). In our research we found that the middle level, community relationships, creates a sense of belonging and builds new social connections that influence food consumption. Therefore we propose a new dimension of food well-being that is focused on developing relationships in the food system that foster consumers' and producers' well-being. These relationships are critical for building all different forms of social capital that enable different actors in the food system to act collectively (Woolcock and Narayan, 2000; Vecchio et al., 2022).

Like others (Furness et al., 2022; Hennchen and Schäfer, 2022) we found that CSAs were fostering new connections between consumers and producers. Through receiving veg bags, participants felt more connected with the farm and farmers. They valued getting to know them, usually as part of the delivery, their friendliness and approachability, but also appreciated the ability to find out where their food comes from and how it is grown:

"I've definitely got more of an idea of how they operate and what they grow, and like the effort that they put in than I did before. Like I didn't even know they existed prior to this scheme." Sue, 34, household of three.

As part of the scheme, farms also organized volunteer days, open days and community events, such as pumpkin festival, accessible to all members. Only a minority of participants (n=4) took part in those. Participants who did not visit the farm or engaged in events reported a lack of time or means of transport as main barriers. However, the majority of participants (n=12) felt connected to the farm even without visiting it, just through receiving the veg bag, interacting with producers and others upon delivery and through media. This highlights the importance of different ways of connecting; all of our CSA partners prioritized face-to-face interactions with CSA members, believing that this is the primary way to build relationships with their members. However, our results show that connection with the farm can occur in many ways other than just face-to-face and on-farm interactions and that these connections hold meaning for CSA members. Those who attended events held at farms reported a deeper connection and it played a role in inspiring participants to grow their own vegetables, sharing knowledge and skills and further connecting their family members about the source of their food.

However, even the seemingly insignificant and brief interaction that occurred during the weekly veg bag delivery had a strong positive impact on participants. For example, for a participant receiving a veg bag from a food aid partner, it was a weekly opportunity to access other support from the project:

"She [food aid organization staff] used to come and collect, see... see if we were okay and our well-being, and if we needed anything for the baby, etc., and then... and then just basically handed us the veg bag, and she used to take the veg bags back as well." Ann, 39, household of six.

During a period in which large parts of the UK population are arguably experiencing an endemic of loneliness (Nesta, 2023), the regular, weekly positive points of contact that members experienced as part of the CSA may sometimes be the only positive connection that food-insecure households have outside of their homes. This can be especially true for low-income households, managing the stress of overdue bills, contacts with social and welfare services and other

financial demands on limited household resources, where every contact outside of the household may represent stressful interactions. Positive contact, free of demands, judgment or discrimination, is likely another reason why we see an improvement in well-being experienced by research participants.

Although participants preferred face-to-face interaction, the majority of them also found it useful being connected through different social media, as was also found in previous research (Furness et al., 2022). This included coordinating deliveries of veg bags through WhatsApp, sharing recipes in a Facebook group or watching videos about the farm when they were not able to get there in person. These mediated connections were established and maintained by CSAs, but also community food initiatives, which highlights the importance for building partnerships and cross-sectoral links for improved food well-being. This is also important to note for CSA managers, who are often time-poor. Significant positive benefits can arise from digitally mediated communications, which require less time and fewer resources for CSAs to manage (Furness et al., 2022).

For some participants, this connection also led to more awareness about the wider benefits and challenges of conventional food system. This demonstrates that even 'weak ties' between different and distant agents in food system (Van der Pløeg and Marsden, 2008) have a potential to build knowledge and bridging social capital to enable collective action. For example, after participating in the scheme, some participants expressed concern about the relationship between imported produce and economic viability of small local businesses:

"Yeah, it has built up my awareness to the fact that, you know, it's difficult for a small farm as to keep up with mass produce. Yeah, I mean, the... the cost factor, the... the effect on smaller businesses, and the... the availability to keep up and compete. And also, just really not knowing the source of what you're ingesting." Emma, 58, household of four.

Relationships between community-scale food system actors also proved critical for the success of the intervention tested. Two of the CSA partners worked together with a charity partner within their region. The charity partners were able to identify food-insecure households and facilitate participation in the veg bag scheme. This was easily achieved because the food aid charities had already established trust with the participating households and knew which households were food-insecure. They were able to communicate the objectives of the project and support households in their participation. This facilitation role was critical to circumventing barriers to participation. All of the households participating in these two CSA schemes remained in the study for its full duration. A third CSA partnered with their local council, but the council had very little time to engage with the project and there was poor communication between the council, the farm, the participants and the research team. In addition, there was very little understanding of the particular needs of the participating households. As a result, there was a high rate of dropout among the food-insecure participants within this CSA scheme.

The final farm was unable to identify a partner with whom to work. They approached the local primary school and solicited participants through the free school meal program. In this case, there was almost no communication between the research team, farm and participating households; confusion prevailed about the expectations of the research project and the weekly collection of veg bags. Many veg

bags went to waste because households did not know they were to be collected every week. There was a poor mechanism for households to communicate with the farm or the research team, because there were no pre-existing relationships in place. The CSA partner did not have the time to be able to properly engage with the participating households to explain the scheme, answer questions or support their involvement. The partnership between farms and local food charity partners was therefore important for reducing the burden of time for farms to engage with a solidarity scheme. Farmers were already time-poor, owing to the diverse number of activities they had to tend to on the farm, and the very small profit margins under which they operated. It was often untenable for them to support food-insecure households above and beyond the interactions that were already offered for all of the CSA membership.

3.6. Food policy (United Kingdom context with global application)

Food policy is a dimension that describes the relationship between the government and its policies and people as food consumers (Voola et al., 2018). The specific food policy environment in which the CSAs and our participants are placed influence their food choices and therefore their food well-being. The question of how we address climate change, biodiversity loss, soil security, water security, chemical contamination and other environmental issues, while also delivering healthy, nutritious food for all in the face of shrinking resources and a growing population is globally relevant. This question has been posed in a raft of recent internationally influential reports which have recognized the need for food system change, some calling for a 'great food transformation'. In the UK, there are a growing number of legislations, policies and government strategies to redress food system failings. These include the Good Food Act 2022 (Scotland), Food (Wales) Bill and the National Food Strategy in England.

More often, policy is delivered in a piecemeal fashion in different sectors that intersect with the food system. For example, in Wales, there is the Sustainable Farming Scheme, Community Food Strategy, Social Value and Procurement Bill, Labor-Plaid Free School Meal Agreement, the Environment Act, and the Healthy Weight Healthy Wales Strategy, to name a few. The UK Agricultural Act (2020) sets the framework for agricultural subsidy payments in the post-Brexit era. Rather than making agricultural subsidies available based on the size of the farm, as was the case in the EU Common Agricultural Policy, the UK Agriculture Act requires payments to be made according to the provision of public goods. While the provision of public goods has so far been narrowly interpreted, e.g., healthy soils, tree planting and habitat restoration, increased water retention, and reduced pollution, there is an opportunity to join this legislation up with various other policies and strategies to achieve healthier diets and reduce household food insecurity.

Austerity policies from 2010 onwards have been criticized as a driver for increased food insecurity and poverty in the UK (Lambie-Mumford and Green, 2017), with approximately 20% of the population living below the poverty line (Social Metrics Commission, 2018). In Wales in 2018, 20% of people worried about running out of food and 26% of 16- to 34-year-olds surveyed ran out of food in the previous year (Irdam et al., 2018). The Food Foundation showed that 160,000 children in Wales were living in households for whom a healthy diet, as defined by the Eatwell Guide, was increasingly unaffordable.

We then had the pandemic, where food-insecurity was estimated to have increased to 14% (Goudie and McIntyre, 2021), and further since the cost-of-living crisis, with current calculations of food insecurity in the UK at 20% (and at 27% for Wales; Armstrong et al., 2023). Similar increases in food insecurity have been experienced globally (World Bank, 2021). Further research highlights that in the UK, pre-pandemic, 26.9% of households would need to have spent more than a quarter of their disposable income after housing costs to meet the costs of eating according to the Eatwell Guide (Scott and Vallen, 2019). This is made worse by the cost-of-living crisis, where household disposable income will decrease by 7% over the two-year period between 2021 and 2023 (Office of Budget Responsibility, 2022).

The food system is estimated to be responsible for 30% of global carbon emissions (Crippa et al., 2021). In order to achieve global and national-scale net zero emission targets, we have to shift to more sustainable diets, with a higher proportion of fruit and vegetables that are produced sustainably. However, with even the Eatwell diet increasingly untenable for an increasing percentage of the population, achieving sustainable and healthy diets for all will not be possible. Significant policy shifts are required that address household access to healthy and sustainable foods. This is not just a food justice issue, it is necessary to meet UK legislative commitments to achieve net zero emissions by 2050.

Previous interventions on food security and poverty have failed to generate dietary behavior changes—because they are looking at a limited aspect of food security and consumption—calories, instead of thinking more holistically about food well-being. By focusing on building relationships back into the food system and connecting households to food producers, as is achieved by the CSA model, food well-being is addressed, with corresponding changes in dietary behavior. This focus on the community scale means that the relevant place-based approach is incorporated in how the community may choose to redress food insecurity and build their solidarity models. In the case of our partner farms, their rural location made it difficult for households to physically access the veg bags. In these cases, farms implemented procedures for delivering the veg bags to the participants. This often resulted in weekly chats with families, forming a regular positive point of contact. Particularly during the pandemic, this was very important as loneliness had a great impact on some people.

One CSA partner was running a well-being center which, among other things, installed a community freezer. Surplus vegetables were cooked into meals and made available in the community freezer. That way, people had access to fresh vegetables but were not facing the barrier of learning how to cook them or having limited cooking utensils. Another CSA was doing regular (weekly) cooking demonstrations and workshops to encourage people to cook and engage them with the vegetables. They made the cooking demonstrations publicly available online. Some farms were sharing recipes to provide support for cooking with the vegetables; one of the charity partners started a Facebook group for participating food-insecure households to support recipe ideas and stimulate enthusiasm for cooking unusual vegetables in child-friendly recipes.

Our farm partners also took different approaches to generating funds to support their solidarity schemes. One farm partnered with its members and the charity partner to plan fundraising activities to cover the cost of veg bags. The CSA members brought different ideas, skills and capacity to eventually decide on organizing a community farm fun day. The event attracted 200+ visitors and raised £1,300 and

gave the CSA members agency within the community food partnerships. In addition, it shared the burden of fundraising across all partners. Farm partners often had volunteer days when CSA members could come to the farm and help with different growing activities. Although the rate of participation was not often high, participants appreciated the opportunity to participate, contributing to the sense of belonging within the community.

This approach differs from a national-scale policy that assumes one approach can address food insecurity in all of its different forms. The Scottish Good Food Nation Act, the Food (Wales) Bill and the English National Food Strategy recognize the importance of supporting community-scale actions to help drive this change from the bottom-up and seek to create a national-scale framework for supporting community-scale actions. In all three devolved nations, the legislation and strategy take a food system approach to policymaking, aiming to link up the different challenges across the food system and to create synergies across sectors for achieving a transformation of current food system functioning and outcomes.

4. Policy recommendations

The results presented here demonstrate the power of community-scale actions to reduce household food insecurity and improve well-being. While much of the financing for the solidarity schemes implemented in the Accessible Veg project came from individuals, there is a role to be played by governments (both local and national scale) in the form of increased and sustained financing. One source of this funding can result from implementing 'public money for public goods' payments for community-scale supply chain participants. This can create a source of long-term and secure funding for community growers, suppliers, distributors, and other organizations involved in local food provision services that result in improved environmental sustainability as well as positive public health outcomes. This policy approach can support a more diverse range of actors engaging in community-scale supply chains, generating more resilient consumption patterns that align with health, biodiversity, zero-emission policy targets and other non-food benefits. Additionally, by providing long-term grants for sustainability to organizations involved in community-scale supply chains, such as food hubs and CSAs, governments can reduce administrative burden and loss of capacity and institutional knowledge owing to high turnover related to uncertainty experienced by organizations relying on small, short-term grants.

Other funding recommendations based on outcomes from the Accessible Veg project include developing funding pots for small projects, initiatives and best practice projects (in the range of £5,000) that can be accessed quickly to help farms and/or charity partners to establish a solidarity veg bag scheme or other social innovation that circumvent barriers to participation for food-insecure households. Initial funding enables CSAs to explore and implement the most productive and sustainable model of solidarity for long-term provision of veg bags for food-insecure households. The CSA partners we worked with appreciated the opportunity to use the research funding in the first year to cover the costs of the veg bags, as this enabled them to take risks, experiment and learn how much money

they could generate and how many weekly veg bags could be sustainably supplied.

The successful partnerships between the CSAs and local food charities demonstrated the benefits of supporting local partnerships between actors in the food systems. In the UK, the Sustainable Food Places, co-organized by Soil Association, Sustain and Food Matters, provides support for local food partnerships across the UK. Sustainable Food Places has nurtured networks from initial formation to maturity, through their bronze, silver and gold award program. The English National Food Strategy similarly recognizes the need to support community-scale partnerships and actions (Dimbleby, 2021).

Support and funding can be made accessible to people that experience multiple vulnerabilities, often linked to poverty (e.g., food and fuel insecurity, mental health and physical health issues). Some examples that already exist in its early stages are social prescribing and food vouchers that can be used towards CSA memberships. Healthy Start vouchers in the UK, and similar voucher schemes used elsewhere, such as in the USA can be used to support food-insecure households to access locally-grown and sustainable produce. Vouchers are supplied to low-income households and can be used at retail outlets for purchasing vegetables, dairy products, and meat. Again, this can be achieved through partnership building and a potential integration into the Healthy Start or equivalent voucher program.

4.1. Scaling-up CSAs

One important consideration from this work is about how CSAs can be scaled up. Naturally CSAs are confined geographically to their size and reach. Multiple components, including accessibility to land to expand growing activities, and distance for CSA members to reach the farm are physical factors that limit the scalability of CSAs. Other than increasing in size, another approach to scaling-up CSA activity would be to scale out and increase the number CSAs operating.

There is a lack of evidence about how to best scale up interventions targeting sustainable diets and associated food innovation such as CSAs (Gupta et al., 2022). A guide for scaling up population health interventions published in collaboration with the Australian Department of Health and Aged Care (Milat et al., 2016) recommends four key steps, which can be adapted to considerations around the scalability of CSAs and other community food initiatives.

1. Assessment of scalability, including effectiveness, potential reach and adoption, and identifying the audience for and feasibility of the intervention. This study provides relevant information about engaging with audiences that tend not to be reached by CSAs (i.e., food-insecure households). However, more evidence is needed about how CSA memberships can be made accessible to different consumer groups and how these engage with the CSAs.
2. Develop a scaling-up plan, including outlining a vision of a scaled-up intervention, situational and stakeholder analysis, and evaluation program. Currently, there is a lack of a vision for what community food might look like. National

Governments are developing related food legislation and strategies (e.g., Good Food Nation Act, Scottish Government, 2022). For example, the Welsh Government is developing a Community Food Strategy in which they encourage the production and supply of locally-sourced food in Wales ([Wales Programme for Government, 2021](#)) and the Food (Wales) Bill would implement a process for developing a national food strategy. The findings in this paper can help develop a vision for the future of community food. However, to implement this, it needs clear leadership and co-production of a strategy with stakeholders to develop a scalable plan.

3. Resources and a foundation of legitimacy for scaled-up intervention, including a consultation with stakeholders (e.g., citizen's assemblies, stakeholder workshops with farmers, food retailers, etc.), community support, and government leadership are key. Projects like the one presented in this paper, that work collaboratively with food producers and food aid charities make an important contribution to the legitimacy of scaled-up programs. However, more work is needed in this space and concerted effort to bring these voices together.
4. Coordinated action across key actors, including governance and media narrative, is needed to ensure sustainability and long-term success. CSAs rely on and are a cornerstone for community food and are a key driver for a food system transformation. Coordinated action across the sector is therefore needed to successfully scale-up CSA initiatives and transform the system.

To develop a more robust evidence base of the effects of CSAs on people's health and well-being and, more widely, the food system, efficacy testing and real-world trials are needed. Research is often limited to pilot studies with rather small samples.

5. Conclusion

Many of the above recommendations can be achieved through a few simple actions that make long-term, consistent funding commitments to build community-based partnerships that are capable of delivering health and well-being benefits for food-insecure households, and thereby reducing the cost on the NHS for dietary- and mental health-related illnesses. As public health is a public good, community-scale supply chains could be approached using the 'public money for public goods' principle contained in the relevant Agricultural Bills across the United Kingdom and the Well-being of Future Generations Act (2015).

The Accessible Veg project provided useful insights into the multiple barriers for food insecure households to CSA memberships. Many barriers were linked to underlying poverty and health issues that were often linked to limited access to transport and kitchen tools, and a general sense of capability to prepare the vegetables received in the veg bags. While money was a key issue to accessing veg bags in the first place, this project uncovered that there were further barriers to consider when upscaling. CSA membership provided not just a veg bag, but a sense of community and opportunities for outdoor physical and social activities. These opportunities resulted in co-benefits of improved well-being, health and environmental sustainability. Importantly, successful implementation was dependent on partnerships between farms and food charity organizations and

demonstrates the importance of community-scale partnerships in driving change critical for transforming our food systems.

Data availability statement

Anonymized data in the form of interview transcripts supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by University of the West of England's Ethics Committee and Cardiff University School of Psychology. The patients/participants provided their written informed consent to participate in this study.

Author contributions

CV and ASB: designing research, collecting data, analysis, and writing and editing manuscript. BA: analysis and writing and editing manuscript. AD: interview design, collecting data, analysis, and writing and editing manuscript. All authors contributed to the article and approved the submitted version.

Funding

This research has been funded by University of the West of England, TGRAINS UKRI funding grant: UKRI BB/S014292/1 Bristol Quality Related Funding and Higher Education Innovation Funding, ESRC IAA/Wales DTP National Productivity Investment Fund Accelerating Business Collaborations Funding, Food Sense Wales, and WWF Cymru.

Acknowledgments

We wish to acknowledge the research assistance provided by undergraduate and postgraduate students, including Jane Oliver and Chiara Poletti. We thank our project partners: Graeme Wilson, Polly Davies, Matt Swarbrick, Jenny Stevens, Ben Gregory, Steffan Lemke-Elms, Abel Oakenshade, Emma Maxwell and Tracey Morgan. Their amazing ideas and desire to build equitable community food systems made this project possible. And we thank all of the participants for their willingness to share their experiences with us so that we could learn how to do better. For the purpose of open access, the author has applied a CC BY public copyright licence (where permitted by UKRI, 'Open Government Licence' or 'CC BY-ND public copyright licence' may be stated instead) to any Author Accepted Manuscript version arising.

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The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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RECEIVED 26 April 2023

ACCEPTED 07 September 2023

PUBLISHED 28 September 2023

CITATION

Denton R, Velandia M, Yenerall J, DeLong K, Trejo-Pech C, Chen X, Tanaka K, Rignall K and Schexnayder S (2023) Evaluating factors influencing Tennessee and Kentucky farmers' willingness to sell produce through fresh stop markets.

Front. Sustain. Food Syst. 7:1212764.
doi: 10.3389/fsufs.2023.1212764

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Evaluating factors influencing Tennessee and Kentucky farmers' willingness to sell produce through fresh stop markets

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Introduction: The food justice movement focuses on resolving food system inequalities, including, but not limited to, income, ethnicity, and race differences related to household access to food, farmer access to markets, and the fair treatment of farmworkers. Previous studies have focused on food system inequalities from the consumer demand side, but only a few studies have focused on the role farmers play in creating more equitable food systems. An example of a market model aiming to fulfill various missions of the food justice movement is Fresh Stop Markets (FSMs). FSMs aggregate food from local farmers and sell shares on a sliding scale based on consumers' income. Lower income households pay less than higher-income households for the same food. A vital component of this market concept is farmers' willingness to sell produce through FSMs.

Methods: We used data from a 2020 survey of Tennessee and Kentucky fruit and vegetable farmers and the double-bounded dichotomous choice contingent valuation approach to assess farmers' willingness to sell produce through FSMs when faced with a price discount scenario. A probit regression was used to investigate the factors correlated with farmers' willingness to sell produce through FSMs.

Results and discussion: Results suggest gross farm revenue, farmer age, education, experience selling produce through farmers markets, and running programs on the farm to educate communities about sustainable agriculture and food systems are associated with farmers' willingness to sell produce through FSMs.

Conclusion: Farmer and farm business characteristics, as well as prior experience running education programs on the farm related to sustainable agriculture and food systems are important factors to consider when trying to engage farmers willing to sell produce through FSMs.

KEYWORDS

farmers' willingness to sell, fresh stop markets, price discount, food justice, probit regression

1. Introduction

Previous studies have described the mission of the food justice movement as one that aims to restructure food systems to address societal inequality and disparity issues (Gottlieb and Joshi, 2010). When addressing food systems, some define the food justice movement in combination with ecological and economic sustainability and social justice (Alkon and Agyeman, 2011). Others have emphasized the existence of racial and economic inequalities through the food systems from production to consumption and ways to address these inequalities (Alkon and Mares, 2012). In general, the food justice movement addresses various elements of the food system, including unequal access to fresh, nutritious, affordable, and culturally appropriate food among households, the wellness of farm workers, and the social, economic, and environmental sustainability of family farms, among other related elements (Gottlieb and Joshi, 2010; Alkon and Agyeman, 2011; Allen, 2016).

While the number of studies related to initiatives connected to the food justice movement in the context of local food systems has increased in the past two decades, the vast majority of these studies focus on strategies to increase consumer access to fresh fruits and vegetables at market outlets such as farmers markets, Community Supported Agriculture markets (CSAs), and food hubs (Quandt et al., 2013; Cotter et al., 2017; Pershing and Hendrickson, 2017; Bradford et al., 2019; Hanson et al., 2019; Kaiser et al., 2020; McGuirt et al., 2020; Kasprzak et al., 2021).

There are very few studies evaluating farmers' experiences and involvement with initiatives connected to the food justice movement. The majority of these studies focus on farmers selling or willingness to sell produce to low-income consumers and the impact of these activities on the economic viability of their businesses (Pilgeram, 2011; Pershing and Hendrickson, 2017; Hodgins and Fraser, 2018; Kaiser et al., 2020; Sitaker et al., 2020; Montri et al., 2021). These studies use farmer interviews to assess motivations and barriers to selling products through market outlets located in low-income areas or serving low-income communities. Limitations of these studies include the inability to generalize results from a small sample of farmer interviews (i.e., 12–27 farmers), and their focus on market outlets aiming to fulfill one goal of the food justice mission (e.g., increase low-income households' access to farm-fresh products) but not multiple goals of the food justice mission.

Data from a 2020 survey of Tennessee and Kentucky fruit and vegetable farmers was used to assess farmers' willingness to sell produce through Fresh Stop Markets (FSMs). FSMs are defined as a market outlet that addresses multiple aspects of the food justice mission. Specifically, FSMs address low-income, food-insecure (i.e., having unreliable or restricted access to adequate food due to individuals' household-economic status or other social factors) households' access to farm-fresh products, connecting small- and medium-sized, limited-resource farms to markets, and community engagement that promotes and supports sustainable agriculture, sustainable food systems, and healthy eating (Velandia et al., 2021). We used the double-bounded dichotomous choice contingent valuation approach (Hanemann et al., 1991) as a reference to design a survey instrument aiming to assess farmers' willingness to sell produce through FSMs. This approach allowed us to present realistic price discount scenarios survey respondents will face when selling produce through FSMs. A probit regression was then used to evaluate the

factors correlated with farmers' willingness to sell produce through FSMs at a price discount.

Some of the correlations evaluated with the probit regression included the correlation between willingness to sell produce through FSMs and activities that represent different levels of farmer engagement in terms of money and time investments (i.e., donating produce to food banks, providing low-income family discounts, participating as leaders or volunteers in organizations with a food justice mission, and running programs on the farm to educate the community about sustainable agriculture and food systems). For example, donating produce will imply low time and money investments as a third party coordinates the logistics of donations. In contrast, running an on-farm education program implies a higher investment from the farmers' perspective than donating produce.

Farmers' willingness to participate in initiatives connected to the food justice movement, specifically selling their products through market outlets with a food justice mission, such as FSMs, is critical for the success and long-term sustainability of these initiatives (Velandia et al., 2021). For the case of FSMs, understanding the profile of farmers and farm businesses that are more likely to be interested in participating in FSMs is essential when evaluating the ability to engage farmers in FSMs and replicate this market model successfully.

1.1. FSMs background

FSMs is an example of an initiative supported by New Roots Inc., a non-profit organization covering various aspects of the food justice mission that depend heavily on farmer engagement (Velandia et al., 2021). New Roots Inc. has successfully implemented this market model for more than 10 years with a great impact on the community they serve, providing access to fresh, healthy organic produce to 715 families—a large percentage of these families are categorized as limited resources households-, and generating a revenue of \$160,000 for local farmers in 2021 (New Roots Inc., 2023). The longevity of this market model and the positive impact this market has had on Kentucky communities make this market model an attractive model to be replicated.

A FSM is a market occurring every 2 weeks, for 20 weeks, during the growing season at a specific location that provides local produce to customers on a sliding scale. This means that households receive access to the same amount of food at different costs based on their income. Therefore, higher-income households will pay a higher amount for a share (i.e., a box of fresh produce) than lower-income families so that these families can have access to fresh food at an affordable cost. Currently, there are eight FSMs, seven located in Louisville, Kentucky, and one located in New Albany, Indiana (New Roots, Inc., 2023).

On the production side, New Roots, Inc. tries to guarantee that fresh produce available for a FSM originates from small, limited-resource, minority farmers. New Roots, Inc. is responsible for all marketing efforts. Therefore, farmers have no costs associated with recruiting and maintaining buyers. Additionally, New Roots, Inc. is responsible for aggregating the food and delivering it to the markets to decrease the logistics burden for farmers. Finally, although there is no binding contract between the farmer and New Roots, Inc., farmers have a better understanding of the products they could sell through FSMs before the production season because New Roots, Inc. provides information about

the potential produce volume and kinds of produce a farmer could sell through the FSMs each season. This information and reduced marketing efforts associated with selling produce through FSMs reduce farmers' risk associated with selling produce through other direct-to-consumer market outlets (e.g., farmers markets). Farmers who have sold produce through FSMs indicated that these market outlets are less labor-intensive, entail lower marketing efforts, and allow them to move larger volumes of products compared to other outlets such as farmers markets and CSAs (Velandia et al., 2021). These benefits explain why farmers find this market outlet attractive even though they receive prices lower than those they receive for their products at other retail market outlets such as farmers markets. Three farmers providing more than 50% of the produce sold through FSMs to shareholders in 2019 indicated receiving prices between 20 and 30% below the prices they receive for produce sold through farmers markets and CSAs (Velandia et al., 2021).

2. Methods and materials

2.1. Data

The data used in this study is from a 2020 survey of Tennessee and Kentucky fruit and vegetable farmers conducted between February and May. The survey instrument was approved by the University of Tennessee Institutional Review Board (IRB) (UTK IRB-19-05601-XM).

The contact list of 961 farmers representing fruit and vegetable farms located in 32 counties across East Tennessee and 14 counties near the Lexington and Louisville, Kentucky areas used for this survey was obtained from the Tennessee and Kentucky Departments of Agriculture. The 14 Kentucky counties included in the survey were counties where FSMs are or were located, or counties that share boundaries with counties where FSMs are or were located. We assume that farms located in these Kentucky counties might have a better understanding of how FSMs work and, therefore, be more likely to provide useful information about their willingness or not to sell products through FSMs. We acknowledge that the selection of counties to be included in the survey will impact the representativeness of the sample and our ability to generalize results from our analysis. In the results section, we discuss the representativeness of the sample used in this study.

The survey was a mixed-mode survey consisting of mail [paper] and web versions. A total of 245 Tennessee farmers for whom we had e-mail addresses received the web version of the survey between February and March 2020. Those Tennessee farmers for whom we only had mailing addresses and not e-mail addresses (i.e., 58) and those who did not complete the web version of the survey by April 2020 (i.e., 222) received a mail version of the survey. A mail version was also sent to all Kentucky farmers (i.e., 658) in the contact list since we only had mailing address information for these farms. A total of 161 farmers from the 961 farmers included in the contact list completed the survey. This represents a 17% response rate.

2.2. Survey

The survey included questions related to farmer engagement with food justice activities, including donating produce to food banks,

providing low-income family discounts, participating as leaders or volunteers in organizations with a food justice mission, and running programs on the farm to educate the community about sustainable agriculture and food systems.

The survey also included questions related to farmers' willingness to sell produce through FSMs, market outlets they used, and farmer and farm business characteristics (e.g., farmer age, education, gross farm revenue). A copy of the survey instrument is available from the authors upon request.

Only farmers who have never sold produce through FSMs were asked about their willingness to sell produce through FSMs. Before eliciting respondents' willingness to sell produce through FSMs, we provided the following information:

"Imagine that you had the choice to sell produce through Fresh Stop Markets. This market outlet has the following characteristics:

1. Fresh Stop Markets representatives communicate with the farmers about items needed for the market. They are responsible for aggregating the food and delivering it to the markets to decrease the logistics burden for farmers.
2. A non-profit organization is responsible for all marketing efforts. Therefore, farmers have no costs associated with recruiting and maintaining shareholders.
3. The mission of this market is to give low-income, food-insecure families access to fresh, healthy foods.
4. There is no binding contract between the farmer and the non-profit organization coordinating this market opportunity, but this organization provides information about the potential produce volume and kinds of produce a farmer could sell through the Fresh Stop Markets."

The double-bounded dichotomous choice contingent valuation approach (Hanemann et al., 1991) was used as a reference to assess farmers' willingness to sell produce through FSMs. The method involves presenting respondents with two bids, in this case, two price discount scenarios. The second bid or price discount scenario is contingent on the response to the first bid or price discount scenario. If the respondent answers "yes" to the first bid or price discount, a second bid or price discount higher than the first one is presented to the respondent. If the respondent says "no" to the first bid or price discount, then a second bid or price discount lower than the first one is presented to the respondents. Our approach differs from the double-bounded dichotomous choice contingent valuation approach in that all respondents were presented with the same initial bid or price discount instead of randomly assigning various price discounts among respondents.

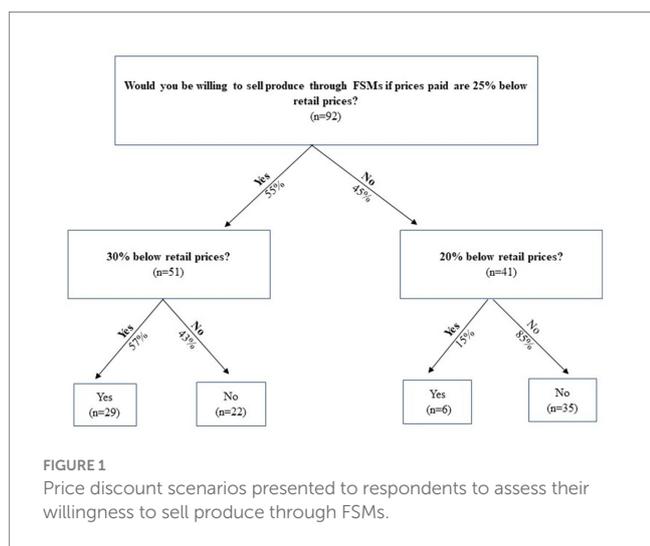
The approach used in this study allowed us to assess farmer willingness to sell produce through FSMs under realistic market conditions, specifically price discounts over retail prices of anywhere between 20 and 30%. All respondents were initially asked if they were willing to sell to FSMs at a 25% price discount (i.e., prices paid are 25% below retail prices). Next, respondents were presented with a second possible price discount based on their response to this initial price discount. Those who responded yes to the 25% discount were asked if they would be willing to sell produce through FSMs at a 30% price discount. Those who responded no to the 25% discount were asked if they would be willing to sell produce at a 20% price discount (see Figure 1). The 20–30% price discount scenarios presented to

respondents were created using information from interviews we conducted with the executive director of New Roots Inc. (organization coordinating FSMs) and three farmers who were selling produce through FSMs and who were providing more than 50% of the produce sold by FSMs to customers in 2019. The executive director of New Roots Inc. provided information about the value of a FSM share based on prices paid to farmers. All farmers we interviewed were using community supported agriculture (CSA) as a marketing strategy, and therefore, we asked them to indicate the value of their CSA shares. We estimated the difference between the value of the FSM shares and the value of the farmers' CSA shares. This information was used to determine the percent price discount scenarios presented to survey respondents.

We created a variable that captures farmers' willingness to sell produce at prices between 20 and 30% below retail prices. Similar to Rihn et al. (2023), we coded producer responses regarding their willingness to sell produce at a price discount scenario between 20 and 30% into a binary variable. Our single binary indicator of willingness to sell takes a value of one for respondents who responded Yes-Yes, Yes-No, or No-Yes, or Yes to at least one of the price discount scenarios

presented in Figure 1. Those who selected no (i.e., No-No) in all price discount scenarios are, in general, those who are not interested in selling produce through FSM at any price discount of 20% or above.

When creating our single binary variable indicator, we noticed only six respondents indicated that they were not willing to sell produce through FSMs at a 25% price discount level but were willing to sell produce through FSMs at a 20% price discount level (see Figure 1). When considering these six respondents as unwilling to sell produce through FSM, we ignore that we have additional information indicating they were interested in selling produce through FSM when faced with a 20% discount scenario. Because we had very few observations in the No-Yes category, we wanted to ensure these observations belonged to the category representing respondents willing to sell produce through FSMs. We tested for statistically significant differences between the characteristics of those who indicated a willingness to sell produce at a 20% price discount level (i.e., No-Yes) and the characteristics of the respondents who indicated they were willing to sell produce at a 25% (i.e., Yes-No) or 30% (Yes-Yes) price discount level. Overall, these subsamples were similar. These results further justify the way we coded responses to create our willingness to sell variable.



2.3. Variables hypothesized to influence willingness to sell produce to FSM

A list of the variables capturing respondent and farm characteristics hypothesized to influence willingness to sell produce through FSMs, as well as their definitions, hypothesized signs, and descriptive statistics, are included in Table 1.

In this study, we assumed that a farmer's decision to sell produce through FSMs is not only related to reducing risks associated with the uncertainty of marketing fruits and vegetables and maintaining or improving these farms' economic viability but also to farmers' values, goals, and motivations for farming (Kaiser et al., 2020; Sitaker et al., 2020; Montri et al., 2021). For example, previous studies suggest that farmers' interest in serving low-income communities and the ability to promote sustainable agriculture, sustainable food systems, and healthy eating through community engagement could

TABLE 1 Regression sample dependent and explanatory variables' description and summary statistics (n = 92).

Variable	Description	Hypothesized sign	Mean
y_i	= 1 if the respondent is willing to sell produce to FSMs; 0 otherwise		0.619
Age	Respondent's age in years	-	58.413
Education	= 1 \geq bachelor/graduate degree; 0 otherwise	+/-	0.641
Farmers market	= 1 farmer sold produce through farmers markets in 2019, 0 otherwise	+/-	0.663
Farm_revenue	= 1 if annual gross farm revenue was \geq \$25,000 in 2019; 0 if gross farm revenue was $<$ \$25,000	-	0.293
Low_Income Household_Price	= 1 if farmer offers a price discount to low-income households; 0 otherwise	+	0.174
Donate	= 1 if farmer donates produce to food banks; 0 otherwise	+	0.554
Edu. Programs	= 1 if farmer runs education programs to educate the community about sustainable agriculture and food systems; 0 otherwise	+	0.228
Leader	= 1 if a farmer has been involved as a leader or volunteer in an organization with a food justice mission; 0 otherwise	+	0.261

be related to farmers' participation in market outlets aiming to fulfill at least one of the food justice missions (Kaiser et al., 2020; Sitaker et al., 2020).

We captured farmer values, goals, and motivations for farming through variables indicating farmer engagement with food justice activities such as offering price discounts to low-income households (Low_Income_Household_Price), donating produce to a food bank (Donate), serving as a volunteer or leader in an organization with a food justice mission (Leader), and offering on-farm, agricultural education programs to communities (Edu.Programs). Each of these variables captures different levels of engagement or investment in terms of time and money and is considered a non-monetary motivation for farmers' willingness to participate in FSMs.

We expected that all variables described above (Low_Income_Household_Price, Donate, Leader, and Edu.Programs) might positively correlate with farmers' willingness to sell produce through FSMs. We assumed that farmers offering price discounts might already have a price discount incorporated in the business plan that aligns with their values and motivations for farming, which gives them more flexibility to transition to selling produce through FSMs. Additionally, donating produce gives farmers an avenue to fulfill their goal of increasing low-household income access to fresh produce while at the same time giving them an alternative avenue to sell produce at discounted prices that otherwise will be donated to a food bank. Also, selling produce through FSMs could align with their values and goals related to participating as leaders and volunteers in organizations with a food justice mission. Finally, farmers running educational programs on their farms might perceive FSMs as an extension of their efforts to educate the community about sustainable food systems. Farmers already investing time and money in educating the community on sustainable food systems might be more committed to further any efforts to achieve the goals of the food justice mission in their communities.

We assumed that farm business characteristics could also be correlated with farmers' willingness to sell produce through FSM. Specifically, we assumed that gross farm revenue (Farm_revenue), as a measure of farm size, is negatively correlated with farmers' willingness to sell produce through FSMs. The literature related to farmer participation in an Alternative Food Network (AFN) suggests that small farms might be more attracted to sell products through these networks, which FSMs could be classified as, because they might be more likely to have excess labor with a low opportunity cost (e.g., no job opportunities, lack of skills) such that farmers would be willing to participate in market activities with low returns (Corsi et al., 2018).

We assumed that farmer characteristics are correlated with farmers' willingness to sell produce through FSMs. We specifically hypothesized that farmer age (Age), farmer education (Education), and farmer experience selling produce through farmers markets (Farmers_market) are correlated with farmers' willingness to sell produce through FSMs.

We postulated that the farmers' age is negatively correlated with farmers' willingness to sell produce through FSMs. As suggested by previous studies, older farmers have shorter planning horizons and, thus, might be less likely to change or modify their production and marketing strategies (Walton et al., 2008; Zhong et al., 2016; Edge et al., 2018; Dong et al., 2019). On the other hand, we hypothesized that education could be positively but also negatively correlated with farmers' willingness to

sell produce through FSMs. We expect knowledge and information to affect farmer marketing or market outlet choice decisions (Pilgeram, 2011; Zhong et al., 2016; Edge et al., 2018). Those decisions could be to sell but also to not sell produce through FSMs.

Finally, we expect farmers' experience selling produce through farmers markets (Farmers_market) could be negatively or positively correlated with farmer willingness to sell produce through FSMs. On the one hand, price discounts over retail prices (e.g., farmers markets prices) might deter farmers from selling produce through FSMs. On the other hand, the potential reduced labor and costs associated with marketing produce through FSMs compared to farmers markets might motivate farmers to sell produce through FSMs.

2.4. Probit regression model

Survey respondents' willingness to participate in FSMs is hypothesized to be a function of farmers' values, motivation for farming, and farmer and farm business characteristics as described below,

$$y_i = \mathbf{x}_i \boldsymbol{\beta} + \varepsilon_i \quad (1)$$

where y_i captures willingness to sell produce through FSMs, and takes the value of one ($y_i = 1$) if the respondent is willing to sell produce through FSMs at a price discount between 20 and 30% and takes the value of zero ($y_i = 0$) otherwise; \mathbf{x}_i captures all respondent and farm characteristics hypothesized to influence willingness to sell produce through FSMs (see the hypotheses section above); $\boldsymbol{\beta}$ represents all parameters associated with \mathbf{x}_i ; and ε_i is the error term.

The probability of a farmer i willing to sell produce through FSM is defined as (Amemiya, 1981; Greene, 2012),

$$\begin{aligned} P(y_i = 1 | \mathbf{x}_i) &= P(y_i^* \geq 0 | \mathbf{x}_i) = P(\mathbf{x}_i \boldsymbol{\beta} + \varepsilon_i \geq 0 | \mathbf{x}_i) \quad (2) \\ &= P(\varepsilon_i \geq -\mathbf{x}_i \boldsymbol{\beta} | \mathbf{x}_i) = P(-\varepsilon_i \leq \mathbf{x}_i \boldsymbol{\beta} | \mathbf{x}_i) \\ &= F(\mathbf{x}_i \boldsymbol{\beta}) = \Phi(\mathbf{x}_i \boldsymbol{\beta}), \end{aligned}$$

where $F(\cdot)$ is the cumulative distribution function for the random variable ε_i . We assume ε_i is normally distributed, and therefore $\Phi(\cdot)$ is the cumulative normal distribution. Therefore, a probit regression is used to estimate the binary choice model described in Equation (2) (Amemiya, 1981; Greene, 2012).

In order to evaluate the association between the probability of a farmer willing to sell produce through FSMs and \mathbf{x}_i , we estimated the average marginal effects (Greene, 2012). The marginal effects allow us to evaluate whether there is a positive or negative association between the independent variables, the probability of a farmer's willingness to sell produce through FSMs and the magnitude of this association. The marginal effect for a continuous variable k can be defined as,

$$\frac{\partial \Pr(y_i = 1)}{\partial x_k} = \phi(\cdot) \beta_k, \quad (3)$$

where $\phi(\cdot)$ is the probability density function for the normal distribution. For a discrete variable l the marginal effects can be defined as,

$$\Pr[y_i = 1 | x_i = 1] - \Pr[y_i = 1 | x_i = 0] \tag{4}$$

The probit regression and the associated marginal effects were estimated using the statistical software Stata version 18 (StataCorp., 2023).

3. Results

3.1. Sample overview, representativeness, and descriptive statistics

There were 112 observations for analysis after eliminating survey responses of those who indicated not producing fruits and vegetables for sale in 2019 and those who were selling or had sold products through FSMs (i.e., 49). A total of 92 observations were used for the regression analysis after eliminating 20 observations due to missing values.

Similar to Velandia et al. (2020a,b), we assessed the representativeness of the Tennessee and Kentucky fruit and vegetable farms included in the regression sample by comparing the sample distribution of acres in fruit and vegetable production to the distribution of acres in vegetable production according to the 2017 Census of Agriculture (USDA, 2022).

Figure 2 shows the distribution of Tennessee farms based on acres in fruit and vegetable production for the regression sample

and the distribution of Tennessee farms based on acres in vegetable production according to the 2017 Census of Agriculture (USDA, 2022). The distribution of farms for the regression sample followed closely the distribution of vegetable farms according to the 2017 Census of Agriculture. The regression sample tends to underrepresent farms with less than 1 acre in vegetable production and slightly overrepresent farms reporting between 5 and 50 acres in vegetable production. The overrepresentation of medium-sized farms (i.e., 5–50 acres) could be explained by the fact that those farms might be in a better position to expand their market outlets based on the volume of fruits and vegetables they produce compared to those farms with less than 1 acre in vegetable production. They, therefore, might be more likely to be interested in responding to a survey assessing their willingness to participate in a new market outlet.

We evaluated the representativeness of the Kentucky farms included in the regression sample by comparing the average fruit and vegetable acres reported by the Kentucky farms included in this sample with the average acres in vegetable production for Kentucky farms according to the 2017 Census of Agriculture (USDA, 2022). On average, the Kentucky farms included in the regression sample are larger in size, based on acres in fruit and vegetable production (7 acres), compared to the Kentucky vegetable farms according to the 2017 Census of Agriculture (3.63 acres). Similar to the Tennessee farms included in the regression sample, operators of larger Kentucky farms might be more likely to respond to a survey exploring their participation in a new market outlet because they might be in a better position to expand their market outlets compared to operators of smaller farms.

The means of the dependent and all explanatory variables included in the regression analysis are presented in Table 1. More

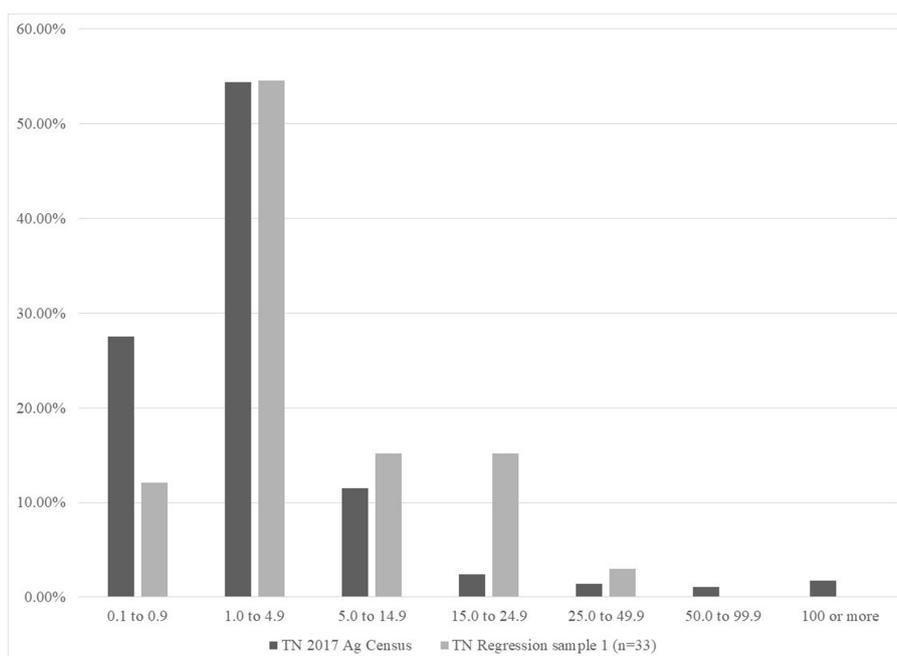


FIGURE 2 Percentage of Tennessee farms in each farm size category based on acres in vegetable production according to the 2017 U.S. Census of Agriculture and the probit regression sample.

than half of the respondents (62%) indicated they were willing to sell produce through FSMs at a price discount of anywhere between 20 and 30%. About 64% of the respondents included in the probit regression indicated having a bachelor's degree or higher, and they were, on average, 58 years old. About 29% of the respondents reported more than \$25,000 in annual gross farm revenue. More than half (66%) of the respondents reported selling produce through farmers markets in 2019.

More than half of the respondents (55%) included in the regression sample reported donating produce through food banks. About a fourth of the respondents (26%) indicated they had been involved with an organization with a food justice mission as a leader or volunteer, and also about a fourth of respondents (23%) indicated they run educational programs to educate the community about sustainable agriculture and food systems. Finally, 17% of the respondents indicated they offer price discounts to low-income households.

3.2. Probit regression results and marginal effects

Parameter estimates from the probit regression with the corresponding standard errors, statistical significance levels, average marginal effects, and diagnostic test results are presented in Table 2. We only present the marginal effects associated with statistically significant parameters. The Wald test statistic evaluating the overall significance of the probit regression suggests at least one of the independent variables included in the regression is different than zero. The condition index (15.82) indicates there are no collinearity issues that could affect inferences from the estimated parameters (Belsley et al., 1980).

There were three variables negatively correlated and three positively correlated with the probability of a respondent's willingness to sell produce through FSMs. The three variables negatively correlated with the probability of participating in FSMs were gross farm revenue (Farm_revenue), operator age (Age) and farmers serving or who have served as volunteers or leaders in an organization with a food justice mission (Leader). The three variables positively correlated with the probability of participating in FSMs were operator education (Education), experience selling produce through farmers markets (Farmers_market), and farmers running education programs to educate the community about sustainable agriculture and food systems (Edu.Programs).

These results suggested that older operators, those reporting more than \$25,000 in gross farm revenue, and those who have been involved as leaders or volunteers in organizations with a food justice mission are less likely to be willing to sell produce through FSMs at price discounts between 20 and 30% over retail prices. Respondents who reported annual gross farm revenue of more than \$25,000 were 20% less likely to be willing to sell produce through FSMs. Those respondents who have been engaged as leaders or volunteers in an organization with a food justice mission were 23% less likely to be willing to sell produce through FSMs.

In contrast, the results suggest that farmers with a bachelor's degree or higher, experience selling produce through farmers markets, and who run education programs on their farms related to sustainable agriculture and food systems are more likely to be willing to sell produce through FSMs. Respondents who had a bachelor's degree or higher were 16% more likely to be willing to sell produce through FSMs. Also, respondents

running education programs on their farms were about 31% more likely to be willing to sell produce through FSMs. Finally, respondents who indicated having experience selling produce through farmers markets were about 17% more likely to be willing to sell produce through FSMs.

4. Conclusions and discussion

Some of the results presented in this study are consistent with our hypotheses and align with findings from previous studies. Our results related to the negative correlation between age and willingness to sell produce through FSMs suggest that older individuals are less likely to be willing to change their marketing strategies by adding FSMs to the mix because they have a shorter planning horizon (Dong et al., 2019). Also, our results suggest small farms might be more attracted to selling produce through FSMs, which is consistent with previous studies evaluating farmers' willingness to participate in Alternative Food Networks (AFN) (Corsi et al., 2018). Finally, findings related to farmers offering on-farm, agricultural education programs to communities suggest that the alignment of farmer values and motivation for farming with the goals of FSMs will positively affect their participation, as suggested by previous literature related to farmer participation in market outlets with a food justice mission (Kaiser et al., 2020; Sitaker et al., 2020). Specifically, respondents who are already investing time or

TABLE 2 Parameter estimates from the bivariate probit regression.

Independent variables	Parameter estimates	Marginal effects
Constant	0.850 (0.817)	
Age	-0.023** (0.012)	-0.006
Education	0.592* (0.306)	0.159
Farmers market	0.629* (0.329)	0.169
Farm_revenue	-0.751** (0.373)	-0.202
Low_Income_Household Price	-0.842 (0.529)	
Donate	0.378 (0.327)	
Edu. Programs	0.114** (0.047)	0.306
Leader	-0.865** (0.040)	-0.232
<i>n</i>	92	
Wald test χ^2	28.75***	
Condition index	15.82	

Values in parenthesis are robust standard errors. Statistical significance at the 10, 5, and 1% levels are indicated by *, **, and ***, respectively.

money in running education programs on their farms are more likely to be willing to sell produce through FSMs.

The results related to farmers running on-farm educational programs might help communities interested in replicating the FSM model identify farmers likely to sell produce through FSMs in their communities. For example, incorporating on-farm education programs in the FSM model could add value to the model and help attract farmers willing to sell produce through FSMs.

The result associated with the negative correlation between respondent engagement as leaders or volunteers in organizations with a food justice mission is surprising and not consistent with our hypothesis. A potential explanation for this result is that farmers already investing time as leaders or volunteers in their communities might be less likely to sell produce through FSMs due to time constraints that prevent them from adding one more market outlet to their marketing strategies. They might also believe their time as leaders and volunteers already contribute to the food justice mission. Additionally, respondents with experience as leaders or volunteers in organizations with a food justice-related mission could have more insights about the challenges related to running and sustaining organizations or market outlets with a food justice-related mission (Velandia et al., 2021), which might deter them from considering market outlets with a food justice mission.

Results related to the positive correlation between farmer level of education and willingness to participate in FSMs suggest that more educated farmers might better understand the concept of food justice and better assess the impact of the price discounts they would be facing when selling produce through FSMs on their farm businesses. The additional information might positively influence their decision to sell produce through FSMs. These farmers could be used as advocates of FSMs and as information sources for farmers interested in selling produce through FSMs.

Finally, results associated with farmers' experience selling produce through farmers markets suggest, the potential for reducing marketing costs when transitioning from farmers markets to FSMs might motivate farmers to sell produce through FSMs. Farmers who understand the potential cost savings associated with transitioning from farmers markets to FSMs might also serve as information sources for farmers interested in selling produce through FSMs.

There are several limitations of this study that need to be acknowledged. The sample available for the probit regression used in this study was limited to specific regions in Tennessee and Kentucky. Therefore, we cannot confidently generalize the results and conclusions for this study and apply them to farmers located outside the geographic regions included in the regression sample. As a result, future research should focus on accounting for more farmers located in a much larger geographic area. Furthermore, future research should also determine the specific price discounts farmers are willing to accept for their produce when selling produce through FSMs. The survey design and methods used for this study did not allow us to assess willingness to accept estimates. Future studies could improve the survey design to allow for these estimates. These estimates will provide organizations interested in replicating the FSM model with valuable information regarding the specific price discounts farmers are willing to accept when attracting market suppliers. This information will help prevent these organizations from setting price discounts that could negatively impact farm net profits, and, therefore, farmer participation in FSMs.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

This study was approved by the University of Tennessee Institutional Review Board (IRB) (UTK IRB-19-05601-XM). The study was conducted in accordance with the local legislation and institutional requirements. A brief informed consent statement was attached to the survey instrument. Participants' willingness to respond to the survey constituted documentation of their consent.

Author contributions

MV, CT-P, KT, and KR conceived the project, designed the study, and wrote the grant. JY, KD, and XC helped with the survey design, provided the ideas for survey analysis, and contributed to the writing of the final manuscript. SS coordinated survey distribution, data collection, and cleaning. MV and RD did the survey data analysis, conducted the literature review, and wrote the final draft of the manuscript. All authors contributed to the article and approved the submitted version.

Funding

This work was supported by the Sustainable Agriculture Research and Education (SARE) program [grant number LS18-300] and the Hatch Multistate project S-1088, TEN00579.

Acknowledgments

We acknowledge Karen Moskowitz, executive director of New Roots, Inc., for providing valuable information that helped design the survey instrument. We would like to thank all the participating farms, including those that provided information to help design the survey instrument.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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RECEIVED 16 June 2023

ACCEPTED 27 September 2023

PUBLISHED 12 October 2023

CITATION

da Rocha Oliveira Teixeira R, Arcuri S, Cavicchi A, Galli F, Brunori G and Vergamini D (2023) Can alternative wine networks foster sustainable business model innovation and value creation? The case of organic and biodynamic wine in Tuscany. *Front. Sustain. Food Syst.* 7:1241062. doi: 10.3389/fsufs.2023.1241062

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Can alternative wine networks foster sustainable business model innovation and value creation? The case of organic and biodynamic wine in Tuscany

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Over the past two decades, the wine sector has witnessed a significant rise in sustainable practices driven by concerns about sustainability and their impact on wine quality. However, the lack of a common framework for sustainability concepts has resulted in a wide range of practices. Among these, biodynamic viticulture has gained remarkable traction among producers due to its perception as a strong quality indicator, despite the lack of scientific consensus and regulatory alignment across countries. Biodynamics traces its origins back to the organic movement and is viewed by some scholars as a radical progression of organic agriculture. The surging popularity of biodynamics is rooted in the expanding organic movement, reflecting consumer demand for ecologically-conscious, premium goods. Amid this complex backdrop, the wine industry grapples with navigating diverse sustainability approaches and formulating effective business models for competitiveness. Vital is comprehending and adeptly conveying sustainability values to consumers. Prior research mainly quantified sustainability's impacts, external drivers, and motivations. However, a gap remains in exploring sustainable business models' role in driving innovation and value creation through alternative networks in the wine sector. This paper presents findings from a phased qualitative study in Tuscany (Italy), reflecting on the evolving landscape. The results underscore synergies between biodynamic and organic approaches, emphasizing their strong connection with the territory. These strategies synergistically promote sustainability and differentiation, enhancing product quality, reducing environmental impact, and fostering territorial engagement. The study accentuates the role of territorial and business context, profoundly influencing collaborative and proactive strategies among producers, exemplified by networks like Lucca Biodinamica. These networks catalyze innovation, knowledge dissemination, and collaborative initiatives, profoundly impacting strategy adoption and advocating for sustainability. Within such ecosystems, a nurturing environment for sustainability practices is cultivated, spurring innovation and winery cooperation. Case studies vividly illustrate that wineries within these networks frequently adopt proactive sustainability stances, grounded in shared environmental and societal commitment. Conversely, some scenarios feature place-rooted leadership models tied to factors like origin, winemaking tradition, and wine tourism, driving innovation. Participating in alternative wine networks represents a strategic choice with lasting personal and economic implications—a framework for innovation and embracing sustainability.

KEYWORDS

sustainable business models, biodynamic wineries, organic wineries, alternative wine networks, multifunctional agriculture, wine sustainability

1. Introduction

Over the past 20 years, the wine sector has witnessed a remarkable surge in sustainable practices, fuelled by the industry's heightened consciousness of sustainability concerns and its perceived enhancement of wine quality (Gilinsky et al., 2016; De Steur et al., 2019). However, the absence of a unified sustainability framework has resulted in a wide spectrum of practices (Santini et al., 2013). Biodynamic viticulture, known for its distinct identity and holistic methodology, has gained traction among producers as a potent quality indicator (Negro et al., 2015), despite the lack of global scientific consensus and regulatory alignment (Hughner et al., 2007; Szolnoki, 2013). Its adoption is propelled by potential advantages encompassing soil health, water management, pollution mitigation, climate resilience, and biodiversity preservation.

This approach shares historical roots with the early 1990s organic movement, where consumer preferences shifted from industrial agri-food products to “high-quality” food and wine, increasingly associated with environmentally-friendly farming practices (Dejas, 2013; Ponte, 2016). Goodman (2003) termed this shift a ‘quality turn,’ centered on trust, embeddedness, and locality. Analyzing this transformation, Krzywoszynska (2015) delineates relational and reflective activities fostering alternative food and beverage networks. The ascent of biodynamics in the wine sector likely corresponds to the organic network's development, with scholars viewing biodynamics as an advanced iteration of organic agriculture (Castellini et al., 2017). Within this context, alternative wine networks arise as localized, self-organized systems connecting producers and consumers, emphasizing proximity, sustainability, equitable relationships, and ethical practices to revolutionize the wine industry (Barbera and Dagnes, 2016).

Organic and biodynamic vitiviniculture share common principles but diverge in their sustainable winemaking methods. Organic viticulture adheres to regulations like the EU Regulation (European Union, 2018) 2018/848, banning synthetic chemicals (fertilizers, herbicides, insecticides), and emphasizes environmental impact reduction. It aims to optimize grape quality and health by managing soil fertility, pest control, and weed management. Techniques include composted fertilizers, green manure, and residue burial, embodying the “feed the soil, not the plant” philosophy (Dejas, 2013). Certification comes from government bodies or third-party agencies after a three-year transition.

Biodynamic agriculture, conceived by Rudolph Steiner in the 1920s, embraces a holistic and ethical farming philosophy. It envisions the farm as a living, interconnected entity that nurtures biodiversity, ecosystem vitality, and cultural creativity (Castellini et al., 2017). Sharing core principles with organic farming (Pergamo et al., 2016), both certifications limit chemical inputs, emphasize soil fertility regeneration, and endorse biodiversity. Biodynamic certification, typically issued by the Demeter Association, builds upon organic certification to further restrict the use of additives and minimizing sulfur dioxide.

Debate exists about the significance of organic and biodynamic markets in the literature, with some questioning the need for further research. Lockshin and Corsi (2012) posit these markets as small, stable niches, where consumers may prioritize quality over sustainability attributes. However, Pomarici and Vecchio (2019) counter with rising demand for healthful, quality foods and beverages. Research also reveals diverse and evolving consumer preferences (Schäufele and Hamm, 2017), compelling producers to meet these needs and effectively communicate their sustainability efforts. As interest in biodynamics grows among wine producers, organizations, and NGOs, the rationale for deeper research is evident, particularly in addressing business and management gaps within the context of organic agriculture.

Over the past 20 years, organic vineyard expansion has been exceptional, showing a 600% surge overall and a 114% rise in the past decade (Willer et al., 2021). The global organic vineyard area has more than quadrupled, reaching 468 thousand hectares in 2019, comprising about 7% of the total global vineyard expanse. Of this, roughly 17 thousand hectares hold biodynamic certification. France, Italy, and Spain, key players in advocating sustainable agriculture, encompass 70–75% of the organic vineyard area. Notably, Italy boasts a 5% share of biodynamic farms within the organic sector, yielding an approximate turnover of 4.6 billion Euros. Throughout this transformation, these nations have witnessed the rise of various sustainability-linked methodologies (Corbo et al., 2014) and diverse ‘bottom-up’ marketing initiatives (Brunori and Rossi, 2000).

The wine sector faces the challenge of navigating the diverse and stimulating landscape of sustainability approaches, which can be challenging from a business perspective. Understanding effective business models to achieve a competitive advantage through sustainability is therefore crucial. It is important to accurately communicate sustainability values to wine consumers, as there is a risk of overestimating the benefits and idealizing certain aspects of greener brands. This will ultimately benefit consumers who are willing to pay a premium for sustainable products.

The current research landscape in sustainable wine business predominantly centers around quantifying the transformative effects (Merli et al., 2018; Broccardo and Zicari, 2020; Muñoz et al., 2020; Masotti et al., 2022). External drivers (Castellini et al., 2017; Obi et al., 2020) and motivations have also been examined (Casini et al., 2010; Vecchio, 2013). Some studies delve into sustainability certification indicators (Corbo et al., 2014; Muñoz et al., 2020; Stanco and Lerro, 2020), exploring their influence on consumer decisions (Sogari et al., 2015). Yet, the majority focuses on production efficiency and quality, lacking insight into the translation of societal and environmental value into winery profitability and competitive edge. Significantly, research has largely disregarded sustainable business models (SBM), entrepreneurial acumen, and innovation's role in fostering sustainability (Barth et al., 2021).

The aim of this paper is to address this gap by focusing on SBMs associated with alternative—i.e., organic and biodynamic—wine

networks, paying special attention to the process of business model innovation and value creation at territorial level. It does so by answering the following set of questions: RQ1. What specific conditions add value to the choice of a sustainable business model? RQ2. What kind of strategies are implemented for sustainability? RQ3. What are the main implications for the management?

Since the research encompassed three different fields of study and their interconnections—sustainability in the wine sector, the role of SBMs, and the impact of organic and biodynamic wine on sustainability innovation and value creation at the territorial level—we adopted a phased qualitative research process.

The remainder of the paper is organized as follows: the next section illustrates the results of a critical literature review, addressing concepts and gaps related to wine sustainability (2.1) and to SBMs and business model innovation (2.2) and the initial definition of an analytical framework (AF) (2.3). The research methodology is illustrated in section 3, whereby we outline the case study region, sample selection for semi-structured interviews, and methods applied for data analysis. Findings are illustrated in detail in section 4, while in section 5 we draw from the main results to further refine the AF and discuss the case study implications. Finally, the conclusion section pays specific attention to the main limitations and the practical value of the insights for the wine management.

2. Results of the critical literature review

In this section, we describe the results of a critical literature review we conducted to achieve a twofold objective. First, we identified and appraised most significant contributions in the fields of wine sustainability and Sustainable Business Models and provided a conceptual synthesis. Second, we used the most significant conceptual items to start developing a new AF, which we outline in this section and then resume in the discussion.

2.1. What is wine sustainability?

Despite the abundance of scientific publications, there is currently no prevailing definition or vision of sustainability among academics, policymakers, nor winemakers. This lack of consensus has led to diverse interpretations and operational approaches, impacting decision-making for both producers and consumers. A clear understanding of the opportunities and benefits of a common sustainability implementation is needed (Baiano, 2021).

The wine industry's focus on sustainability extends beyond specific agricultural modes (organic, biodynamic, green, natural, regenerative, etc.) or certifications (e.g., the French *Haute Valeur Environnementale*, *Terra Vitis*, etc.). Various practices and production methods aim to minimize impacts and protect or enhance natural resources, such as soil, but wine has also a long tradition of acknowledging the importance of the natural environment, as epitomized in the nineteenth century by the concept of *terroir*, which emphasizes the connection between production site characteristics and wine quality.

Sustainability in the wine sector encompasses a broad term that involves recognizing the long-term impact of human activities on the

environment. Gilinsky et al. (2016), for instance, define wine business sustainability as the preservation of land for future generations and encompassing the entire supply chain, energy consumption, and social responsibility.

Research on wine sustainability has primarily focused on consumer perceptions and sustainable production (Casini et al., 2010). However, there is a need to address the ambiguous nature of sustainability and bridge the gaps in understanding between countries and wineries (Warner, 2007; Ohmart, 2008). In this regard, Santini et al. (2013) conducted a systematic review of wine sustainability research and found significant heterogeneity in management, strategic, and marketing literature, with geographic areas facing stronger sustainability pressures showing significant differences. Other authors have explained different degrees of sustainable behavior among companies through models evaluating sustainability orientation (Casini et al., 2010).

The benefits of sustainability strategies and their impact on winery performance are understudied (Gilinsky et al., 2014). Sustainability is seen as a niche strategy contributing to differentiation and cost reduction, and offering a competitive advantage in the global market while playing a role in brand management and value creation for marketing and communication (Dressler and Paunovic, 2021).

An interesting aspect of the wine sector response to the sustainability challenge is the development of business networks that focus on sustainability programs (e.g., California Sustainable Winegrowing Alliance, Wine Sustainable Policy in New Zealand, etc.). Most of the literature analyzed the environmental performance of these programs (Hughey et al., 2005; Pullman et al., 2010; Corbo et al., 2014; Giacomarra et al., 2016; Gilinsky et al., 2016; Flores, 2018), while little has been said about the integration of social and economic aspects of sustainability and its implication for the management of the wineries (Klohr et al., 2013). The International Organization of Vine and Wine (OIV) defined sustainable vitiviniculture in “CST 1–2004” as a global strategy encompassing economic viability, quality production, viticultural precision, environmental integrity, product safety, consumer health, and cultural preservation (Aurand et al., 2014). Though originally social-centric, subsequent guidelines (CST 1/2008, VITI 422/2011, and OIV's 016 General Principles of Sustainable Vitiviniculture) have leaned toward environmental aspects, sidelining social and economic facets (Merli et al., 2018). Yet, consensus is growing that sustainability must span the supply chain, including water/energy efficiency, social responsibility, and labor conditions (Gilinsky et al., 2016). This entails resource efficiency, reduced chemicals, lower emissions, and better waste management, while respecting workers' rights, contextual integration, and ensuring safety.

2.2. What are business models, business model innovation and sustainable business models?

Business Model (BM) research spans diverse areas, offering valuable insights into organizational strategies, consumer behavior, market dynamics, and sustainability (Barth et al., 2021). However, there is no universally accepted definition of BM, and the literature in the agricultural sector lacks a unifying theory. Scholars have related the concept to business innovation (McGrath, 2010; Taran et al.,

2015), circular approaches (Bocken et al., 2018; Lüdeke-Freund et al., 2019), social entrepreneurship (Yunus et al., 2010), and sustainability (Schaltegger and Wagner, 2011; Adams et al., 2016; Yang et al., 2017; Dressler and Paunović, 2020). Interest was shown in the analysis of single business cases or by addressing the entire value chain (Amit and Zott, 2012).

BM offers valuable insights into a company's profitability, operations, customer base, and value propositions. It serves as a conceptual tool for understanding how a firm operates and plays a crucial role in management, including analysis, performance assessment, communication, and innovation (Beattie and Smith, 2013; Bocken et al., 2014). With a well-defined BM, companies can gain deeper insights into their operations, make informed decisions, drive growth, and adapt to the ever-changing business landscape. BMs play a crucial role in shaping a firm's competitive strategy. They involve strategic decisions related to the design of products or services offered to the market, pricing strategies, production costs, differentiation tactics through value propositions, and the firm integration within a broader value network. By carefully addressing these aspects, businesses can position themselves strategically, create unique value for customers, and establish a sustainable competitive advantage in the market.

Some authors call for 'static vs. dynamic approaches' (Lee, 2015). A static approach to BM portrays a collection of interconnected core components that form a cohesive whole, while the dynamic approach presents a means of effectively managing organizational change and fostering innovation within the organization. In the dynamic approach, it is assumed that value is created through interrelationships and interactions among the components of the business model. Changes in one component can have direct or indirect effects on other components, highlighting the interconnected nature of the system. This dynamic gives rise to what Brannon (2011) refers to as Business Model Innovation (BMI). It entails the exploration of innovative approaches to create novel combinations using existing model components. BMI extends beyond processes and products, encompassing 'the way you do business' (Amit and Zott, 2012) in terms of the value generated, not only for customers but for a broader range of stakeholders. Through a comprehensive value-network perspective, BMI has the potential to catalyze the transformation of the entire system. Likewise, SBMs embrace the creation of economic, social, and environmental value for a diverse set of stakeholders (Bocken et al., 2014). SBMs models that create a competitive advantage through superior customer value not only benefit the company but contribute to sustainable development within the broader society (Lüdeke-Freund et al., 2019).

Barth et al. (2021) introduced a Three Values (3V) framework for SBMs, based on earlier work by Schaltegger et al. (2016) and Bocken et al. (2014) and encompassing three traditional elements: (i) the value proposition (product/service offering, customer segments, and customer relationships), (ii) value creation and delivery (activities, resources, partners, and distribution channels), and (iii) value capture (cost structure and revenue model).

With their study on business models for sustainability in the food and beverage industry of Germany, Dressler and Paunović (2020) provided empirical evidence to the SBM categories by Schaltegger and Wagner (2011). They create a typology of SBM that encompass environmental and societal objectives within evolving market environments, establishing a connection to the innovation driven by

sustainability. Likewise did Bocken et al. (2014) with the sustainable archetypes approach.

However, existing analyzes of business models often overlook the essential connection with the internal and external business environment and related strategies. This results in a static understanding of business model typologies. A broader perspective has been adopted by Grando et al. (2020), who argued that conditions encompass the comprehensive business environment, including various factors that influence wineries' behavior. Similarly, Vergamini et al. (2019) identified a set of conditions specific to the wine sector at regional level, including physical factors, agro-ecological conditions, regulations, standards, firm resources and capabilities, and socio-cultural factors related to terroir characteristics. The impact of such conditions on firm strategies varies depending on the region, reflecting distinct local configurations and networks of farmers (Paasi, 2010; Ilbery et al., 2016). For instance, Chaminade and Randelli (2020) provided evidence that the transformation process of the bio-district of Panzano (Italy) is unique to its specific location, despite the strong growth of the organic and biodynamic movement. Pomarici et al. (2021) suggested that place-based SBMs emphasize the importance of a regional perspective when examining how wineries make decisions related to quality and marketing channels. Brunori (2007) defined relational relocation as a strategy of reconfiguration of both production and consumption in alternative food networks (AFN).

2.3. A proposal for a new analytical framework

This paper offers a comprehensive perspective on the business environment by integrating internal and external conditions. Beyond the conventional elements (e.g., assets, resources, and organizational aspects), we explore their interaction within the broader regional context. Our approach captures conditions influenced by wineries and those prompting unique strategies, thus impacting the 3Vs framework. Value proposition shifts consequently shape sustainability practices and innovative BMs. Drawing on the insights of Vergamini et al. (2019) and Grando et al. (2020), we gauge producers' capacity to shape strategies. Our analysis of internal conditions encompasses a wide spectrum of factors influencing strategies, such as resources, capabilities, culture, and mission, with a focus on core business attributes, notably scale. The long-term characteristics of the production unit—logistics, organization, and reputation—also influence strategy development. Moreover, factors like working capital, investment traits, credit options, debt levels, and sunk costs significantly impact strategy evolution. These elements interplay directly and indirectly with three additional sets of conditions shaping the firm's regional context: factor endowment, soft laws, and terroir traits. While distinguishing internal, external, and regional conditions may not always be straightforward, it's essential to note that the dynamic nature of the business environment is interconnected with strategies crafted in response to changing circumstances and the emergence of new business models. Taking into account this representation of the business environment, we therefore outline a proposal for a new AF comprising—and integrating—earlier work by Dressler and Paunović (2020), Schaltegger and Wagner (2011), and Schaltegger et al. (2012).

Illustrated in Figure 1, the AF takes the form of a sustainable practices pyramid, molded by the evolving business environment and resulting strategies. On the left side are distinct business models arrayed along a sustainability gradient—from financially-driven and market-oriented to the pinnacle of sustainable entrepreneurship. The pyramid’s right side portrays strategies aligned with sustainable practices and their corresponding BMs. Defensive strategies maintain the existing model with minimal changes, yielding limited sustainability impact. Accommodative strategies introduce some BM enhancements, while proactive strategies involve complete BM redesign for comprehensive innovation. Notably, proactive strategies have a deeper, enduring influence than accommodative ones. In practice, blurry BM boundaries and hybrid strategies emerge. The success of a BM is intertwined with geographical context, market dynamics, institutional frameworks, and industry relations—factors pivotal in determining the fate of innovative models, whether they thrive or face challenges.

We provide a description of how various levels of sustainability approaches can manifest within the wine industry, as illustrated in Figure 1:

- At the foundational level, ‘enhanced’ Geographical Indication (GI) requirements are embraced by ‘financial and market-oriented’ BMs, aiming for quality, process control, and market integration (Freyer and Bingen, 2015). This model focuses on containing costs, increasing profitability, and gaining a

competitive advantage (Dressler and Paunović, 2020). European wineries adhering to GI schemes prioritize environmentally conscious vineyard management and winemaking that preserves terroir values. Stringent control procedures ensure wine quality, and additional voluntary measures address specific environmental goals. While these companies prioritize quality and terroir, their sustainability changes are minimal, often aligning with a defensive—also: conservative—strategy.

- Progressing, an evolving level emerges, characterized by engagement with certification schemes that communicate sustainability, protect consumers, and ensure transparency. Accommodative BMs adopt these approaches, leveraging certifications and standards as marketing tools for customer loyalty, service enhancement, and social engagement. The focus is on ‘customer-centric’ and ‘social-centric’ BMs that align with sustainability goals, aiming to create meaningful narratives for sustainable production. Organic certification, focusing on sustainable agricultural practices and reducing harmful inputs, indirectly addresses social aspects, i.e., by ensuring a safer working environment. Similarly, Vegan and food safety certifications (e.g., ISO 22000, TS 22000, IFS Food, and ISO 22005) prioritize efficiency and resource conservation rather than social aspects. Here, a move toward social responsibility can involve fair trade practices and community development support.
- Moving upwards, toward advanced sustainability approaches, wine producers integrate agricultural, technological, social, and

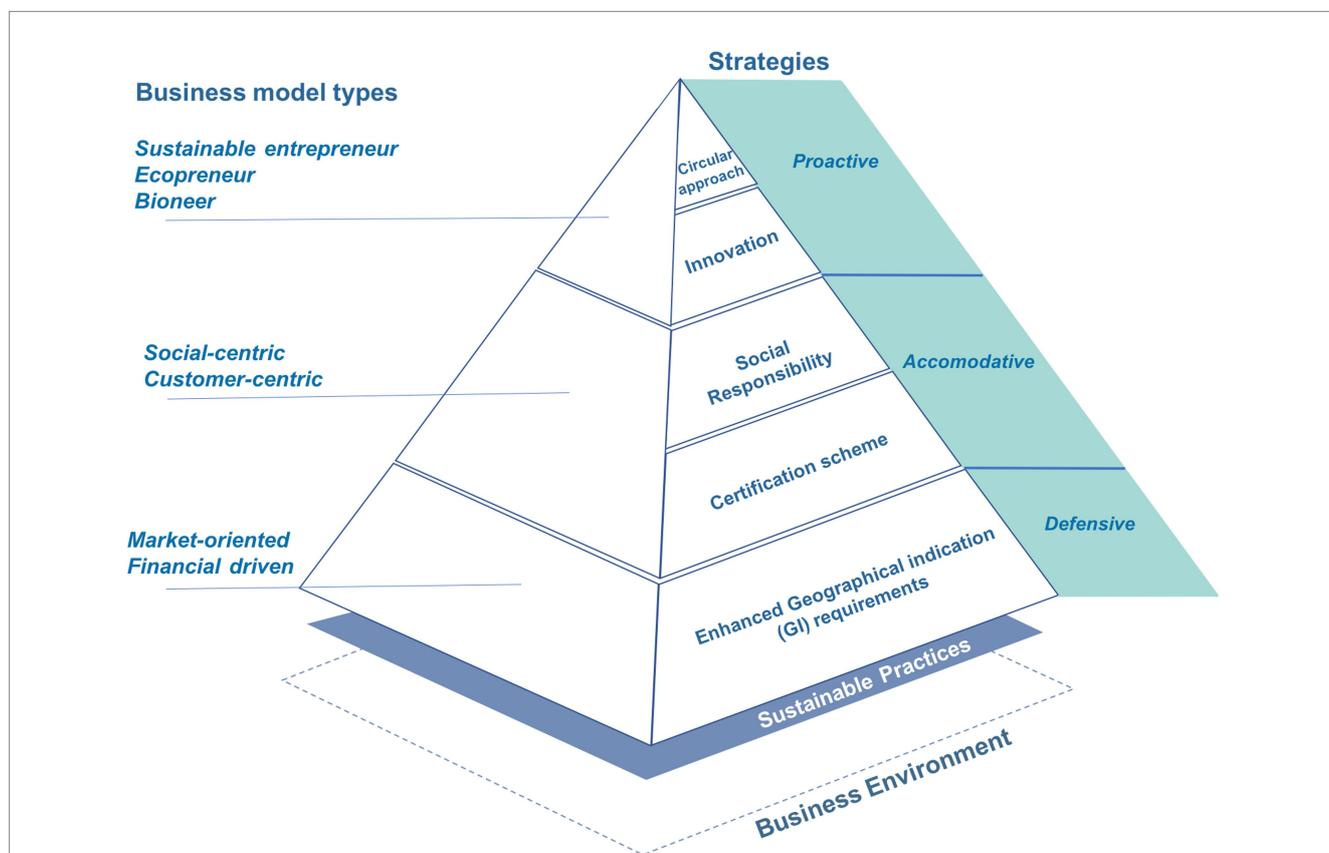


FIGURE 1 Sustainable practices in relation to strategies and business model types. Source: Authors’ own elaboration from Dressler and Paunović, (2020); Schaltegger and Wagner, (2011); Schaltegger et al., (2012).

organizational innovations through proactive strategies. These innovations enhance current sustainability practices and often introduce novel ones. At this level, organic and biodynamic producers coexist, where biodynamics strive to surpass and extend beyond organic methods. 'Natural wines' producers adopt minimal intervention, additives-free methods, often utilizing organic or biodynamic grapes (Corbo et al., 2014). Further innovation encompasses transformative shifts like cooperation networks, novel principles, and system thinking. Biodynamics emphasizes complexity and interdisciplinary skills. The 'bioneers' approach within biodynamics values natural substances, reconnecting wine to its origins and managing risks through diversity. Producers at the highest sustainability echelon target circularity. 'Ecopreneurs' BMs close cycles, minimizing resource use and emissions. Regenerative farming prioritizes soil health, water protection, and biodiversity, seen through practices like cover crops and non-chemical pest management, all reducing environmental impact.

- At the top, 'Sustainable producers,' performing leading sustainability approaches. Waste reduction, efficient water use, energy conservation are paramount. Climate change mitigation involves carbon sequestration, reduced emissions, and water conservation. Plastic replacement with natural materials is adopted. Energy efficiency is achieved through renewables and geothermal systems. Environmental and social goals are actively communicated through private certifications¹ and recognized standards, with greenhouse gas emission reductions tracked.

The pyramid framework is resumed in the Discussion section, where the results of the case study are discussed according to—and contribute to refine—the AF.

3. Methodology

This paper is grounded in a broad critical reflection conducted through a phased qualitative research process, encompassing three interconnected fields of study, namely: sustainability in the wine sector, the role of SBMs, and the impact of organic and biodynamic wine on sustainability innovation and value creation at the territorial level. We initiated our research by conducting a critical literature review, resulting in an initial AF (sections 2.1, 2.2 and 2.3). Subsequently, we conducted a case study, collecting data from multiple sources, including through semi-structured interviews. Data analysis through coding techniques allowed us to refine our framework, which forms the basis for our discussion (Yin, 1984; Merton and Kendall, 1990; Saldaña, 2013).

3.1. Case study region and sample selection

The research was conducted in Tuscany (Italy) from 2019 to 2023. The reasons for selecting Tuscany as a case study region are manifold. Here, environmental factors, combined with social, economic, and

historical influences have contributed to the development of viticulture, and wine production plays a vital role for territorial identity, which is in turn globally recognized as a distinguished brand.

More than 12,700 wine companies cultivate nearly 60,000 hectares of vineyards, contributing to 10% of the national vine area. In the last harvest season, they produced 2.04 million hectolitres of wine, making Tuscany the seventh-largest Italian region with 5% of total production (ISMEA, 2022). Despite the significance of wine production, the business landscape primarily consists of small-scale enterprises, with an average vineyard area of 4.7 hectares per firm. Cooperatives play a minor role in the industry, with 15 social wineries contributing to about 18% of the total regional production. The great prominence of individual brands is a distinguishing feature of Tuscany, compared to other wine-producing regions.

An additional key factor contributing to the region's success is the wide range and diversity of the 58 GIs it holds. Among these, there are 52 Protected Designation of Origin (PDO) and 6 Protected Geographical Indication (PGI), which collectively cover nearly all of Tuscany's vineyard area (96.4%), exceeding the relatively high national average of approximately 63%.

The quest for distinctiveness and quality is also reflected in the analysis of data related to organic viticulture. In fact, 32% of the regional vineyard area (i.e., over 19 thousand hectares) is cultivated using organic farming methods, with significant growth during the period between the two censuses (2010–2020), even compared to the national level. Similarly, approximately 350 thousand hectoliters of organic wine produced in Tuscany represent a significant 15% share of national organic wine production.

We conducted a set of 24 semi-structured interviews with stakeholders from the wine industry in Tuscany. The selection of interviewees followed a snowball sampling approach, which began with an initial consultation involving six experts from diverse fields, including manager of organic and biodynamic wineries in Italy, biodynamic agriculture advisors, sommeliers and scholars associated with the Viticulture and Oenology Degree program at the University of Pisa (i.e., entomologists, oenological microbiologists, and agronomists). From an initial list of 150 wineries, we selected 24 biodynamic and organic wine producers, reflecting heterogeneity in their sustainability practices and business approaches, and ensuring territorial coverage (Table 1). Interviews lasted approximately 1 h and were recorded and transcribed. The interview structure encompassed various aspects, including the company's history, objectives, vision, organizational characteristics, key elements of the business environment, and the broader territorial and regional context. Central aspects of production (specialization/diversification, significant changes, investments, etc.), sales, and marketing were also covered. A special focus was dedicated to sustainability in its broadest sense, aiming to navigate through the diverse topics addressed and to discern the aspects on which companies have set their strategies and priorities.

3.2. Data analysis

We applied coding methods (Saldaña, 2013) to analyze interview transcriptions and field notes using NVivo.²

¹ These include the Italian V.I.V.A. program, Sustainable Winegrowing Alliance in California - CSWA program, Sustainable Winegrowing New Zealand - SWNZ, and the Sustainable Wine of Spain certification.

² To gain a deeper understanding of the interview questions and protocol, we recommend consulting Teixeira (2021).

TABLE 1 Organic and biodynamic wineries interviewed in Tuscany between 2019 and 2022.

ID	Province	Certification	Vineyard (ha)	Production (bt/y)	Export (%)	Labels	Price range (Euros)
P01	SI	Biodynamic	175	700.000	80	15	9–220
P02	SI	Biodynamic	31	90.000	75	6	25–200
P03	SI	Biodynamic	12	50.000	-	5	20–44
P04	SI	Organic	12	15.000	50	5	12–50
P05	SI	Organic/self-declared biodynamic	145	850.000	55	13	12–90
P06	SI	Self-declared organic	12	60.000	90	9	7–24
P07	SI	Biodynamic	4	10.000	99	3	20–30
P08	SI	Organic/Self-declared biodynamic	12	35.000	60	8	12–95
P09	SI	Organic	31	90.000	60	6	19–150
P10	LU	Biodynamic	22	70.000	50	3	20–100
P11	LU	Biodynamic	18	120.000	80	8	11–48
P12	LU	Biodynamic	2	12.000	80	5	9–40
P13	LU	Biodynamic	5	20.000	40	4	20–30
P14	PI	Biodynamic	15	70.000	70	10	11–50
P15	PI	Organic	10	40.000	50	7	10–45
P16	PI	Biodynamic	18	80.000	55	7	12–85
P17	PI	Biodynamic	32	155.000	90	6	15–170
P18	PI	Organic	25	100.000	-	13	9–65
P19	LI	Organic	23	150.000	50	14	12–40
P20	LI	Biodynamic	3	13.000	30	4	17–32
P21	LI	Ongoing organic	25	185.000	70	5	20–170
P22	AR	Biodynamic	360	>700.000	90	30	5–22
P23	AR	Biodynamic	10	37.000	45	4	17–52
P24	GR	Biodynamic	35	280.000	80	8	9–50

Source: Authors' own elaboration.

In the first round of coding, we used generic methods like 'structural coding' and 'attribute coding' to organize materials according to the themes addressed in the interviews and the main features of the interviewees. An initial codebook included a basic list of codes, such as the characteristics of the wine farm, the structure, production methods, sustainability investments and main challenges.

Further rounds of coding were used to identify patterns in the business environment, and to understand the conditions which had a role in shaping the wineries' strategies. We prioritized conditions based on explicit expressions from producers and consensus during discussions. At this stage, the codebook had been integrated with internal, external, and regional conditions (see Tables 2, 3), and sustainable practices (Table 4), and others emerging from the data. With the final rounds of coding, we linked the observed sustainable practices to the different categories of BMs and strategies derived from the literature and outlined in the framework. This mixed inductive and deductive coding approach allowed us to refine our analytical framework through empirical evidence.

4. Results

4.1. Business environment conditions

To address RQ.1 "What conditions add value to the choice of a sustainable business model?," we analyzed interview data to identify the business environment conditions that played a fundamental role in shaping the wineries' strategies. We prioritized conditions based on explicit expressions from producers and consensus during discussions. The identified conditions were then categorized and classified using the AF into internal (Table 2) and regional factors (Table 3). To facilitate the understanding of the connections between these conditions, we will provide a cross-referenced analysis of the obtained data, guiding the reader to delve deeper into specific aspects within each table.

At the organizational level, family-based structures and changes in winery management are crucial conditions for sustainable business models. This is exemplified in the provinces of Lucca and Siena, where the presence of ancient villas and historical estates dating back to the

TABLE 2 Internal conditions of firms.

Organization	Family	17
	New management	6
	Merging pre-existing wineries	1
Resource and capabilities	Financial	12
	Wine-making tradition	6
	Reputation	3
	Heritage properties	9
	Tech. investments	7
	Consolidated relations	2
	Multifunctional capabilities	6
	Value	Innovation
Tradition		4
Quality		9
Culture	Creative	16
	Charismatic	9
	Cooperative	5
	Paternalistic	5
	Authoritarian	3
Mission	Prioritizing sustainability	7
	Environmental stewardship	5
	Increase quality	5
	Modernization	2
	Brand survival	2
	Viability	2
	Efficiency	2
	Territorial integration	3

Source: Authors' own elaboration.

15th and 19th centuries, respectively, showcases the long-term management of essential wine assets such as cellars and vineyards. Family-owned businesses with vertical integration have the advantage of controlling both production and marketing, including wine tourism. The family-oriented structure also demonstrates a greater openness to sustainability-driven innovations. This model aligns with existing literature on innovation (Salvato and Melin, 2008; Schmieder, 2014; Miller et al., 2015), emphasizing the family's profound connection to the land and their ability to harmonize tradition and innovation for a sustainable transition (place-based leadership). In regions with a strong winemaking heritage like Montalcino and Montepulciano, leadership changes have been necessary to align mission and values with enhanced sustainability. For instance, P01, a renowned winery in Montepulciano, shifted toward a fully biodynamic system under new ownership. Additionally, external investors acquiring wineries in Tuscany, especially in profitable areas, can lead to significant changes and impact the development of sustainability practices.

Innovation is a key condition in the value system of both models. While the family acts as a catalyst for innovation processes related to quality (improving grape quality, refining techniques and vinification standards, seeking blends that resonate with international preferences, and rediscovering the richness of the regional ampelographic heritage,

TABLE 3 Regional conditions.

Factors endowment	Total
Access to credit	6
Skilled workforce	5
Proximity to cultural cities	15
Organic demand and networks	14
Technology innovation	4
Tourism demand	6
RDP measures	4
Price levels	9
Land access	7
Soft laws	
Domestic	12
Civic	6
Opinion	3
Market	9
Terroir	
PDO area	9
Indigenous grape variety	4
Farmers' network	7
Heritage area	3
Agroecological conditions	12
Cultural and recreational services	5

Source: Authors' own elaboration.

etc.), authenticity, ethics, respect for nature, and sustainability (as values), on the other hand, non-family-owned wineries have demonstrated a greater focus on the relationship between innovation and tradition, and innovation and quality (e.g., blending native and international grape varieties like Sangiovese, Cabernet Sauvignon, Merlot and use modern winemaking techniques, or just adopting advanced fermentation methods that enhance both wine quality and innovation).

In addition, the family structure aligns with regional organizational models in the wine sector of Tuscany, characterized by fragmented supply among small and medium-sized enterprises (Vergamini et al., 2019). Family-owned wineries ensure continuity over time, while innovation primarily thrives in contexts with substantial financial resources (as indicated by 50% of the respondents). In other cases, external conditions as part of the regional context (see Table 4), such as access to credit, land availability, EU support, and premium prices, also influence sustainability-oriented choices in the Region.

The wine industry's development of sustainable models in Tuscany is facilitated by the combination of long-standing traditions, utilization of historic properties, and investments in modernization (resource and capabilities). Wineries incorporate advanced technologies, multifunctionality, and mixed agriculture to expand their scope and enhance sustainability. Creativity and charismatic leaders drive significant changes, while inter-company

TABLE 4 Sustainable practices and sustainable business model types.

SBM	Sustainable practices	Total
Financial-driven	Product diversification Respect minimum environmental and social standards	-
Market-oriented	PDO/PGI standards (preserve territorial conditions) Control processes, products and market (export) Reinforced conditionality standards (CAP) Voluntary agri-environmental schemes (RDP) Improve land-use	1
Customer-Centric	Organic certification Reducing risks for workers Increase transparency Process & resources optimisation: targeted energy savings, recycling (pruning for compost, use of recyclable materials and packaging)	2
Social-centric	Biodynamic certification Assets preservation Long-term stakeholder relation Social engagement activities	4
Bioneer	Preservation of family value Focus on innovation (agricultural, technological, social and organizational) Cooperation networks Risk management	8
Ecopreneur	Minimize resource consumption and Environmental emissions Prioritize soil protection, biodiversity management, pollinator habitat restoration, sustainable fertilizer usage, and social engagement	4
Sustainable Entrepreneur	Promoting farm as integrated system Minimizing waste Efficient water resource utilization Energy savings Social responsibility International sustainability standards Increase sustainability communication	5
Total		24

Source: Authors' own elaboration.

cooperation is important in less-developed regions. Some prioritize sustainability as an integrated environmental and social mission, while others focus on environmental stewardship or efficiency (mission). The focus on quality, modernization, brand preservation, and territorial development is stronger in regions well-suited for terroir viticulture. These efforts result in a strong differentiation of processes, products, and services, utilizing available resources such as animals, forests, vineyards, and other crops (e.g., wheat). However, territorial context influences corporate culture, with some regions emphasizing collaboration and others relying on authoritative approaches. Overall, the wine industry in Tuscany is gradually shifting toward wines with reduced environmental impact, while maintaining high-quality products and integrating sustainability into their missions.

When examining regional factors, these decisions are additionally bolstered by other conditions, including the closeness to cultural cities, the presence of a skilled workforce, as well as growing organic wine demand and networks. The proximity to cities with a rich cultural heritage is considered a crucial condition. Numerous wineries derive advantages from their connection with these centers, especially

in terms of foreign demand and tourism, resulting in enhanced stability in incoming financial flows.

In situations of limited financial resources or when the production area lacks quality recognition—perhaps due to not being a prominent PDO area or lacking any PDO designation—farmers' networks have emerged as pivotal, especially among various terroir conditions. Producers highlight the value of well-established organic and biodynamic networks within the region, acting as important innovation clusters that assist sustainable transformation. The “organic/biodynamic producers network” represents a collective of farmers, vineyard owners, and winemakers dedicated to sustainable agriculture. It involves knowledge sharing, collaborative marketing, supply chain integration, advocacy, education, certification, research, and resource sharing. This network fosters innovation, community, and environmentally friendly practices within agriculture and wine making. Through collaboration, it enhances sustainable farming, disseminates knowledge, and supports a positive industry impact. A notable example is the flourishing cooperative community of biodynamic vineyards and farms in Lucca, which has developed through cooperative relationships and the shared commitment to

chemical-free practices. This cooperative network has not only contributed to the region's development but has also facilitated the exchange of knowledge among local farmers:

"We drew inspiration from Lucca Biodinamica due to our geographical location in Lucca. Engaging in discussions and idea-sharing prompted us to venture into adopting similar practices. We started with experiments in a small vineyard, dedicating approximately three years to this endeavor. Encouraged by the positive outcomes, we subsequently made the decision to extend these practices to our other vineyards." -P11

Geographical localization has a significant impact on the adoption of sustainable practices in the wine industry. In regions well-suited for quality viticulture (PDO area), innovative approaches have emerged, allowing for a more balanced relationship with natural resources compared to conventional methods. However, strict regulations and the absence of common guidelines for greener practices pose challenges for producers in communicating the new quality attributes, such as biodynamic methods, to consumers. Traditional practices associated with PDO schemes can create resistance to change, particularly for established wineries with recognized brands. Some producers in less popular PDO areas have chosen to differentiate themselves by abandoning the emphasis on origin and focusing on international blends and greener production methods. Brand stretching strategies have been employed in these cases.

"Having immersed myself in biodynamics for numerous years, I proudly market my wine as a biodynamic wine. However, for a biodynamic winery situated in Montalcino, the significance of displaying a biodynamic logo may be less critical. Conversely, in PGI area or with a generic Chianti, highlighting the biodynamic aspect proves to be a successful marketing strategy." - P14

Finally, favorable environmental and climatic conditions, along with specific agricultural practices (agroecological conditions), as well as the presence of areas recognized as UNESCO sites (heritage area), and the presence of cultural and recreational services have facilitated farm differentiation.

4.2. Mapping wine farms strategies according to sustainable practices and business model types

To address RQ2. *What kind of strategies are implemented for sustainability?* we identified and then categorized the different sustainable practices implemented by organic and biodynamic wineries. In Table 4, we categorized the various practices under the typologies of SBM identified in the framework.

Only one winery from the province of Livorno stands out for its Market-oriented BM. The winery aims to leverage the quality of the territory, i.e., 'belonging to the renowned Bolgheri PDO' to enhance its competitiveness, primarily through communication. Its actions are oriented toward product diversification while respecting local winemaking practices and traditions, thus exerting a place-based leadership. The practices focus on complying with the standards set

for the PDO, therefore minimum environmental requirements in relation to the territory.

Customer-oriented goals are pursued by three companies located in renowned viticulture areas between Livorno and Siena (Bolgheri, Montalcino, Montepulciano). While they share many practices associated with the "territorial tradition," they also emphasize the green label and make minor efficiency adjustments to strengthen their customer relationships and enhance their value proposition.

Four companies perform practices linked to the Social-centric BM, which gives prominence to the company's social than the environmental sphere. Interviews have affirmed that biodynamics provides companies with a narrative of the "interconnection between humans and nature," resonating strongly with customers in terms of social justice and a commitment to the welfare of the living world and future generations. Clearly, companies at this level, if certified biodynamic, are also certified organic in terms of production and processing aspects. However, their practices focus on the conservation of company assets, the development of long-term relationships with customers and suppliers, and include social commitment initiatives. For example, the case of the company P21 in the province of Livorno, which commissioned a prominent figure in the Italian urban art movement a mural within the company premises. The artwork aims to showcase to visitors the company's work environment.

Approximately 70% of the interviewees declared adopting advanced sustainability approaches, the main characteristic of which is the creation of innovation-based business models that can solve broader market and societal problems. An exemplary case for the model of the bioneer is represented by the biodynamic companies in the province of Lucca. These farmers (P10, P11, P12, and P13) came together to embrace biodynamic practices through collaboration. They formed friendships and later established the formal association Lucca Biodinamica, which quickly gained prominence as one of the leading biodynamic districts in Italy. As one interviewee put it:

"As a small farmer, there is no risk in producing your goods in a specific manner because your product will always stand out, particularly in the case of biodynamics where each wine has its unique authenticity. In Lucca Biodinamica, where the majority of people produce wine, there exists a positive relationship among us, and we don't perceive each other as competitors." -P12

The Lucca Biodinamica network is dedicated to promoting the widespread adoption of biodynamic practices within the local system. Their efforts involve disseminating innovative techniques, exchanging knowledge and equipment among members to reduce costs, and enhancing connections with local restaurants, suppliers, and consumers. The network actively promotes the organic and biodynamic credentials of the Lucca region, considering it a crucial factor in long-term sustainability. Their goals include strengthening the network, expanding the reach of biodynamic methods, and raising consumer awareness about sustainable practices.

Organic and biodynamic companies, both certified and non-certified, fall under the BM of the Ecopreneur. They have developed innovative practices with a clear focus on soil protection, biodiversity management, restoration of pollinator habitats, sustainable use of fertilizers, and social engagement. These companies have an integrated vision of environmental performance within their

TABLE 5 Sustainable strategies and effects on 3Vs framework.

Key conditions	SBM	Sustainable strategies	Effects on 3Vs framework
PDO area Prox. to cultural cities Heritage properties	FD	Defensive/Conservative	The wineries maintain their traditional value proposition rooted in the wine tradition and reputation of the region. Improvements in land use are addressed as well as small efficiency-oriented changes as long as they align with industry regulations or PDO standards. The primary focus is on retaining customer loyalty and enhancing the perceived value of territorial wines. Sales channels (exports), as well as partners and distributors, are facilitated by the proximity to historic cities and internationally renowned cultural centers.
Wine-making tradition Reputation PDO Area Prox. To cultural cities	MO		
Financial Wine-making tradition Ind. Grape variety Quality Prox. to cultural cities Organic demand Tourism Price levels	CC SC	Accommodative	The focus on quality now includes environmental considerations. The value proposition is evolving to meet the changing consumer demands. The industry is becoming more open to the outside world, enhancing its reputation, brand, and appeal to employees. Sustainability-oriented risk management and other basic changes, including process renewal, partnering with different value network participants, and targeting new market segments, may be necessary in order to achieve the desired differentiation and secure the organization's operations, reputation, and long-term viability. The adoption of measures for integrating sustainability considerations and engaging stakeholders is crucial for incorporating sustainability into business strategies and operations.
Agroecological conditions Skilled workforce Farmers' network Technology innovation and investments Creative, Charismatic, and Cooperative culture Multifunctional capabilities	B EC SE	Proactive	A proactive strategy involving incremental and continuous organizational change to enhance value proposition, creation, and capture. The winery radically embraces sustainable innovation, integrating environmental and social sustainability into products/services and efficiency measures. Improved performance and competitive advantage are achieved through outstanding environmentally and socially responsible products and services, benefiting risk management, reputation, and brand value. Communication embodies the new values and is reinforced by sustainability certifications and other international voluntary standards.

Source: Authors' own elaboration. FD, financial driven; MO, market oriented; CC, customer-centric; SC, social-centric; B, bioneer; ECO, ecopreneur, and SE, sustainable entrepreneur.

business framework, with practices that aim to minimize resource consumption and environmental emissions.

Finally, the winery P01 is an example of 'Sustainable entrepreneur'. It is located in the renowned wine region of VINO NOBILE DI MONTEPULCIANO (Siena) and stands out as a large and well-established producer that has embraced sustainability as its core mission. Going beyond the mere marketing aspect, P01 views biodynamics as a comprehensive approach that has allowed for the integration of additional standards such as ISO 9001 and Bcorp, which focus on meeting social and environmental requirements. The adoption of biodynamics has not only provided a framework for the winery's operations but has also facilitated the transfer of this vision to its employees:

"Our objective is to cultivate a substantial amount of land in a sustainable and ethical manner and establish ourselves as a prominent producer of Nobile wine in Montepulciano. With our current size, we have the potential to shape the future of agriculture, and that is precisely what we aim to accomplish here." -P01

Likewise, though from a different environment, a small-scale wine farm (P20) stands out by being the first in the Bolgheri area to achieve organic and biodynamic certification. Despite limited resources, P20 has found a way to differentiate itself within the prestigious region.

The producer is committed to continuously improving its infrastructure, social initiatives, and environmental assets, acknowledging the social aspect as challenging but important for long-term benefits.

"I believe that farmers have the potential to collaborate and devise strategies to meet the required standards by establishing networks with neighbouring farmers. This is precisely what I plan to do here with other winegrowers who may not practice biodynamics but have an interest in livestock or beekeeping. When you genuinely care about biodynamics and recognize its positive impact, you find a way to incorporate it into your practices. It goes beyond marketing; being biodynamic is a matter of conscience and personal commitment." -P20

4.3. Effects of the strategies on the 3V framework

To address RQ3. *What are the main implications for the management?*, we continue by exploring, on a continuum of generic sustainable strategies (defensive/conservative, accommodative, and proactive), how these strategies impact the value proposition, creation, and capture (Table 5).

We grouped wineries strategies into three strategic domains where varying levels of sustainability can be implemented. In the first domain, we found defensive/conservative wineries oriented toward territorial quality. These wineries are situated in regions boasting rich wine-making traditions such as Montepulciano and Bolgheri, granting them a competitive advantage in terms of market recognition. These wineries present management with a comprehensive set of implications. The significance of recognizing and leveraging historical winemaking traditions emerges as crucial, underscoring the preservation of conventional methods and heritage as defining factors for the winery's unique identity. Management, in their endeavour to set products apart, emphasized the distinctive attributes of territorial quality, effectively attracting consumers in search of authenticity. By establishing ties with renowned wine-producing regions, they heightened market recognition and bolstered brand trust. The maintenance of elevated quality standards emerged as pivotal in sustaining reputation and fostering customer loyalty. Deliberations concerning industry leadership, customer education, and the harmonious fusion of tradition and innovation assumed paramount importance. The integration of sustainability practices, while upholding the integrity of historical context, highlighted management's pivotal role in aligning tradition with contemporary demands.

Then we identified organic, biodynamic, and mixed-approach wineries (combining organic certification and biodynamic self-declared) pursuing accommodative strategies. These wineries, situated in territories renowned for producing territorial wines (Montepulciano, Montalcino, and Bolgheri), actively pursue the production of high-quality wines that reflect their origins. They expand their focus to include environmental concerns, aligning with EU policies and meeting the rising demand for healthy and more natural wines (organic). This transition involved not only changes in production practices but also a broader focus on conveying ethical values related to environmental sustainability and biodiversity preservation. P04 embarked on a journey of winery modernization with a strong emphasis on social and ecological aspects, as highlighted by the interviewee:

"In 2017, we initiated the conversion to organic practices. Our focus now lies in conveying our ethical values, which prioritize environmental sustainability and biodiversity preservation in our vineyards." -P04

Nevertheless, the reputation and branding benefits derived from sustainability activities are limited due to their predominantly internal focus and association with quality-related factors. Despite internal efforts, these wineries struggle to fully harness positive branding from sustainability initiatives. Their accommodative strategies—process, product, and organizational innovations—are hemmed in by existing business paradigms. For instance, transitioning wineries focus on communicating greener practices and developing organic products. P04, a Chianti Classico winery, shifted from bulk wine to premium organic offerings. Leading local businesses notably catalyze such changes, setting industry norms and guiding others, exemplified by their role in P04's transformation. Accommodative strategies also encompass differentiation strategies that prioritize cost and efficiency while actively addressing sustainability issues and strategically aligning with local food networks to enhance appeal to specific stakeholder groups. Included in the accommodative strategies are

wineries situated in less prominent regions (like P24 in Grosseto), where a reduced emphasis on internal quality enables a heightened focus on environmental and social aspects. Strategies involve a greater engagement in sustainability (and related communication) to partially enhance appeal to specific stakeholder groups and local food networks.

Most wineries (70%) in this study, however, fall under the category of proactive strategies. These organic and biodynamic wineries demonstrate a strategic approach that prioritizes sustainable innovation and targets environmentally conscious market segments, diverging from traditional competitive positions tied to origin. In these wineries, the management recognized the value of aligning business strategies with sustainability goals and catering to evolving consumer preferences for environmentally-friendly products. In the most advanced wineries (P01, P02, P03, P16, P18, and P22), the proactive strategy focuses on actively pursuing cost and efficiency-oriented activities that are designed to achieve social and environmental objectives. Enhanced sustainability performance yields benefit in terms of risk management, reputation, and corporate brand value. In many cases, the presence of a business culture oriented toward creativity and innovation in a highly dynamic business environment has allowed for remarkable developments. By allocating resources toward sustainability initiatives can be instrumental in achieving meaningful changes in the organization's operations and practices.

In others, financial resources have facilitated sustainable transformation. P01, for instance, embraces biodynamics as more than just a marketing tool: through a stewardship strategy it integrates other standards like ISO 9001 and Bcorp, shaping its vision, attracting high-skilled workers and engaging with stakeholders. Several wineries actively engage in boundary-spanning activities and integrates stakeholders into their operations, and this allow wineries to capture the value of societal and environmental benefits. This also involves a new value proposition that focuses on influencing territorial behavior. For instance, in the case of Lucca Biodinamica, the network aims to foster the widespread adoption of the biodynamic method within the local system. Producers P10, P11, P12, and P13 achieve this by sharing innovative practices, knowledge, and equipment among themselves, resulting in cost reduction and stronger connections with local restaurants, suppliers, and consumers. The emphasis on organic and biodynamic credentials, as well as highlighting the unique characteristics of the Lucca region, is considered vital for the long-term consolidation of the network, the expansion of the biodynamic approach, and raising consumer awareness. Furthermore, these producers demonstrate a sustainable strategy that prioritizes cooperative relationships over financial resources. Similarly occurs for P20 which, despite its limited size and resources, strives to enhance its infrastructure, social connections, and environmental assets. When asked about social aspects, the interviewee admitted they may pose challenges and may not yield immediate profits, but as they put it:

"I believe farmers can collaborate and develop strategies to meet the standards by forming networks with their neighbours. Here, I plan to collaborate with other winegrowers who may not practice biodynamics but are interested in livestock, or I may venture into beekeeping. If you genuinely care about biodynamics and believe it brings positive qualities, it goes beyond mere marketing. Being biodynamic is a matter of conscience." -P20

Management can greatly benefit from prioritizing cooperative relationships over relying solely on financial resources to achieve sustainability goals. Recognizing the potential inherent in collaborative networks among wineries is crucial. When wineries share innovative practices and resources within a network, it can result in tangible advantages such as cost reductions, forging stronger local connections, and ultimately solidifying sustainability efforts over the long term.

5. Discussion: a dynamic approach to sustainable practices, SBMs and strategies

5.1. Enhancing sustainable business models: identifying value-adding conditions

Exploring Tuscany's wine industry spotlights innovative SBMs rooted in territorial values. Diverse sustainability efforts, shaped by various conditions and strategies, are evident. The analysis of SBM determinants (RQ1) reveals a multifaceted dynamic. Internal and regional factors (Tables 2, 3) emerge as key in shaping winery landscape sustainability. Family-based structures, coupled with evolving winery management, notably impact SBMs. Family-owned businesses, especially with vertical integration, excel in overseeing production, marketing, and tourism, harmonizing tradition with sustainability-focused innovation. Wineries prioritize sustainability through modernization, advanced technologies, multifunctionality, and diversified agricultural practices. Charismatic leaders and creativity drive change, especially in marginal areas, relying on cooperation. Resource-centric strategies lead to differentiation across processes, products, and services. Guided by missions and culture, wineries emphasize sustainability, quality, and modernization. Regional contexts shape corporate culture, promoting collaboration or authority. Aligned with institutional analysis and development framework (Ostrom, 2011), regional conditions notably shape wineries' strategies via factors like factors endowment, soft laws, and terroir attributes. Proximity to cultural centers, credit access, skilled labor, and rising organic demand steer decisions. External factors impact regions with quality disparities. Amid alternative farmers' networks and terroir dynamics, collaborations like Lucca Biodinamica drive innovation and sustainability. These networks encourage experimentation and knowledge sharing, nurturing best practices. Geographical location, especially in PDO zones, strongly influences sustainability. Unique techniques, environments, and cultures foster farm diversity, enriching the winery landscape.

5.2. Strategies for sustainability: unveiling implementation approaches

Analyzing RQ2, the study comprehensively categorizes strategies across various SBM types rooted in organic and biodynamic winery practices. Ranging in environmental and social emphasis, some balance efficiency and sustainability, while others prioritise innovation and cooperative networks for holistic sustainability. The pyramid framework (see section 2.3, Figure 1) is revisited to refine insights from

the case study. At the base, a few wineries follow 'enhanced GI requirements', stressing quality, tradition, and local terroir over risky innovations. This reflects defensive strategies arising from viewing sustainability as a potential source of risks. Such wineries prioritize reputation, heritage, and territorial quality, incrementally adapting to norms and regulations. Some adopt sustainability practices for brand alignment rather than inherent value. Quality programs tied to shared institutions can hinder sustainable innovation (Boyer, 2020), favoring sales stability via cause-related marketing. These findings underscore a limited focus on market-oriented strategies in the examined wineries, deviating from existing literature (Santini et al., 2013). Contextual nuances in the Tuscan wine industry may explain strategy variations.

Advancing up the pyramid, consumer-centric and social-centric wineries exhibit heightened sustainability commitment. Through organic certification and eco-friendly practices, they target eco-conscious consumers. These strategies surpass typical market-oriented models, prioritizing environment and society over territorial wine quality, leveraging sustainability for differentiation. Organic and biodynamic associations wield influence, shaping regulations and prices. Notably, the biodynamic certification's principles of social justice and responsibility extend beyond organic standards, adding layers of value for human beings, equal opportunities, and safe working conditions. Accommodative strategies emerge when wineries transition from a territorial to an environmentally and socially conscious value proposition, actively incorporating sustainable practices to appeal to changing consumer preferences.

Then our investigation confirms Bioneers excelling in sustainability. Rooted in family values, they champion innovation, risk management, and collaboration. Lucca Biodinamica is a prime instance, of promoting biodynamics, knowledge sharing, and consumer sustainability awareness. This proactive stance reshapes the value proposition, emphasizing cooperation and driving transformative local change.

Ecopreneurs, nearing the pyramid's top, prioritize sustainability through soil protection, biodiversity management, and social engagement. Beyond certifications, their strategies reflect values exceeding regulations, offering adaptable sustainability integration. These wineries exemplify evolving business boundaries, accommodating varied ethics and environmental values.

At the peak, the Sustainable Entrepreneur Model's transformative potential is evident. In distinct business settings, two wineries adopt biodynamic farming, reshaping value, value creation, and sustainability integration. Biodynamics differentiates and drives continuous winery enhancement, reaching employees and neighboring farms. Proactive strategies catalyze innovation via sustainability-induced changes in processes, products, and organization. Aligning innovation-led sustainability and dynamic capabilities underscores innovation's centrality in sustainable models. By weaving sustainability into their operational fabric, these wineries ensure that sustainability transcends mere lip service, becoming a powerful force that propels both innovation and transformation.

5.3. Management implications: key takeaways and actionable insights

Customizing sustainable strategies is vital, acknowledging the flaws in generic approaches. Wineries' diverse sustainability stages call

for context, resource, and market-aligned strategies. Capitalizing on historical heritage benefits those with rich traditions, enhancing uniqueness. Leveraging tradition, reputation, and quality while integrating regional eco-friendly practices proves advantageous.

Consumer shifts toward ethical and sustainable products highlight the need to align with these evolving trends. Integrating sustainability into the value proposition resonates with eco-conscious consumers, while transparent communication attracts them. Strategic innovation, like bioneer and sustainable entrepreneur models, is key. Collaborations and networks foster resource-sharing for sustainable innovation.

Vital is robust stakeholder engagement: nurturing bonds with customers, suppliers, and local communities boosts sustainability and aligning with stakeholder values through social initiatives enhances brand reputation and loyalty. Certifications like organic or biodynamic align with sustainability goals and confer a competitive edge.

Networking and collaboration are integral components. Associations like Lucca Biodinamica serve as examples of the potential impact of collaborative networks on driving sustainability. Establishing partnerships with fellow wineries to share best practices, reduce costs, and collectively advance sustainability efforts can yield positive outcomes.

Adopting a forward-looking vision for sustainability, prioritizing long-term benefits over immediate profits, is recommended. Sustainable practices can yield substantial gains in areas such as risk mitigation, brand elevation, and customer loyalty. Effective communication plays a pivotal role in this process, and likewise transparently conveying the value of sustainability initiatives to consumers, stakeholders, and the broader community.

Sustainability thrives on constant improvement: evaluating and enhancing initiatives keeps wineries attuned to trends, tech, and consumer shifts. Coherent integration solidifies credibility and authenticity.

Leadership is pivotal. Active management in sustainability, resource allocation, innovation culture, and environmental responsibility drives winery progress, aligning identity, values, and market dynamics.

There are several implications for the management. First, small wine businesses with limited resources need to find the necessary inputs and capabilities for innovating through territorial connections (Dressler and Paunović, 2020; Pomarici et al., 2021). These can be informal or formal networks, producer associations, wine unions, and inter-branch organizations such as wine Consortia for PDOs. Being part of a larger system offers various advantages to individual producers through the scope, relation, and network economies, but in some cases also disadvantages.

Second, in the context of sustainable practices, the adoption process is not fixed, individual, or limited to a simple choice between alternative cost-effective options. Instead, it is influenced by a dynamic and ever-evolving real-world environment. This process involves ongoing education, the exploration of innovative approaches, and a strong emphasis on social factors (e.g., toward families and the territorial community). Third, by prioritizing sustainability, businesses can enhance their appeal to highly skilled workers and attract new talent who are drawn to organizations with a strong reputation for sustainability practices. Finally, it requires a more holistic farming management that becomes a key element in branding and storytelling, particularly for small family wineries with a multi-generational vision.

It serves as a consistent and balanced communication strategy, aligning the company's interests through stakeholder interaction and refining positioning and brand communication.

6. Conclusion

This research study delves deeply into the potential of alternative wine networks to drive SBM innovation and value creation in the wine industry, with a specific focus on the Italian context. The findings illuminate the intricate interplay between business environment conditions, strategic choices, and SBMs.

Research findings shed light on two essential aspects: the pivotal role played by alternative wine networks in nurturing innovation and collaboration, catalyzing the adoption of forward-looking sustainability strategies, and the significance of the strong link between wine and the territory, aligning with recent insights on place-based transformation and territorial innovation ecosystems for sustainability (Köhler et al., 2019; Chaminade and Randelli, 2020; Arcuri et al., 2023).

Both organic and biodynamic approaches are identified as facilitators of sustainable business model innovation and value creation, each with varying gradients of sustainable practices, strategies, and porous boundaries. These approaches not only enhance product quality and reduce environmental impact but also contribute to the long-term viability and resilience of the agri-food system, guided by the systems thinking inherent in biodynamic agriculture.

The study's theoretical contributions are twofold: it refines the existing theoretical frameworks, elucidating how alternative wine networks influence both foundational and apex levels, and it bridges the gap between sustainable business strategies and the role of management and innovation for sustainability. The insights gleaned from alternative wine networks elucidate how sustainability becomes an integrated facet of winery operations, bolstering both ecological resilience and economic viability.

The study's focus on the Tuscany wine industry potentially limits the generalizability of findings to other regions or sectors. Despite efforts to ensure diversity among wineries, the relatively small sample size necessitates caution in extending results. Qualitative interviews offer depth, but might not fully encompass wineries' strategies. Augmenting with quantitative data could provide a more encompassing perspective. Future research could delve into policy effects on extending sustainability in the wine sector, especially in light of the European Commission's proposal to review the GIs system. Addressing this would enrich the understanding of sustainable strategies, enhance validity, and contribute to holistic management frameworks.

In sum, this study underscores the symbiotic relationship between alternative wine networks and sustainable business strategies, revealing a nexus that holds potential for shaping a more environmentally and socially conscious future for the wine industry and beyond.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

RT: methodology, formal analysis, investigation, data curation, writing – original draft preparation, review, and editing. DV: conceptualization, methodology, formal analysis, writing–original draft preparation, review, and editing. FG: review and editing and supervision. SA: conceptualization, methodology, formal analysis, writing–review and editing. GB: supervision and research design. AC: conceptualization and supervision. All authors contributed to the article and approved the submitted version.

Acknowledgments

We thank the reviewers for comments that helped improve the paper.

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RECEIVED 08 June 2023

ACCEPTED 25 September 2023

PUBLISHED 13 October 2023

CITATION

Deskin ZY and Harvey B (2023) Critical food systems education in university student-run food initiatives: learning opportunities for food systems transformation.
Front. Sustain. Food Syst. 7:1230787.
doi: 10.3389/fsufs.2023.1230787

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Critical food systems education in university student-run food initiatives: learning opportunities for food systems transformation

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Introduction: Student-run Campus Food Systems Alternatives (CFSA) have been proposed as spaces which have the potential to advance Critical Food Systems Education (CFSE) – the objective of which is to motivate students to act toward radical food systems transformation on community and systemic levels. Evidence on how learning dynamics in CFSA drive student participants to develop critical perspectives on food systems is limited, however. This paper seeks to address this gap by exploring how critical and transformative learning happens in these informal and student-run spaces, by detailing a multi-case study of students' learning experiences in four student-run CFSA on the McGill University campus.

Methods: Data on students' learning experiences was collected through observational field notes of CFSA activities and semi-structured Interviews with student facilitators. Thematic and cross-case analysis was performed with interview data.

Results: Analysis of students' described learning experiences in CFSA revealed three broad categories of learning dynamics which drive students' learning about food systems and their willingness to act for food systems change: hands-on work in informal spaces, social connection and engagement between student participants, and engagement with the beyond-campus community.

Discussion: Engagement with the beyond-campus community via CFSA, particularly that which involved exposure to food-related injustice in marginalized communities, was found to be particularly important in driving student participants' critical reflection on food systems and willingness to act toward food justice. A lack of intentional critical reflective practice was however observed in CFSA, calling into question how this practice can be driven in campus food initiatives without compromising their student-run and informal structures.

KEYWORDS

critical food systems education, campus food systems alternatives, transformative learning, critical pedagogy, higher education, food systems, food justice

1. Introduction

In the context of the climate crisis and growing global food insecurity, a widespread and holistic transformation of the industrial global food system is being called for [Ruben et al. \(2021\)](#); [IFPRI \(International Food Policy Research Institute\) \(2022\)](#). Education has long been identified as a key tool for enacting social change by enabling students with critical knowledge to transgress and radically transform oppressive power structures in their societies ([Freire, 1970](#); [Hooks,](#)

1994). Given the complex issues of race, colonialism, and class that permeate food systems, food systems education which equips students to enact social change is a necessary leverage point for food systems transformation (Niewolny and D'Adamo-Damery, 2016). However, scholars have warned that conventional post-secondary food systems education, with its focus on technical rather than socio-political dimensions of food production and distribution, is ill-equipped to tackle the systemic drivers of food systems issues (Meek and Tarlau, 2016; Niewolny and D'Adamo-Damery, 2016). Criticism of conventional food systems education points to its tendency to “engage learners as individuals, focusing on proximate (rather than deep system) analysis of political problems” and its emphasis on developing students’ skills as consumers (Anderson et al., 2019, p. 3). As such, conventional food systems education reflects a narrative centered on a presumption of consumer lifestyle choice as the key to addressing food systems issues (Guthman, 2011; Meek and Tarlau, 2016). This reformist and depoliticized approach to understanding food systems issues disregards, and often reinforces, structural racism and other oppressive power structures that fundamentally underlie the way that food is produced, distributed, and consumed (Guthman, 2011). Education that advocates for and mobilizes meaningful food systems transformation must therefore be predicated upon a critical engagement with interconnected power structures.

1.1. Transformative education as a leverage point for food systems change

Transformative education seeks to uncover and disrupt students’ perspectives and mindsets, by providing them with the knowledge and agency to challenge power structures and ultimately act toward societal transformation (Mezirow, 2011; Simsek, 2012; Aboytes and Barth, 2020). In the context of food systems education, transformative learning supports students’ critical engagement with the power relations, values and social norms that underpin our food system (Anderson et al., 2018; Ojala, 2022). Ojala (2022) posits that learning for food systems transformation must also involve students in their own community, to ground learning in observable actions, practices, and power relations. Critical service-learning is one approach to this: theorized as a powerful tool for mobilizing students to act toward food justice, critical service-learning engages students in a dynamic process of critical reflection and intentional community action such that they can become aware of, and act toward transforming, systemic inequalities in their society (Mitchell, 2008; House, 2014). Fundamental to this transformative food systems learning is challenging students to engage in critical thinking about the systemic drivers of the community issues they are engaging in – before, throughout, and after participating in community food projects (House, 2014).

1.2. Critical food systems education

Critical Food Systems Education (CFSE), a pedagogical framework developed by Meek and Tarlau (2016), formalizes theories of transformative and critical learning to propose a radical alternative to conventional food systems education. CFSE roots itself in Freire’s theories of popular education and critical pedagogy: education which encourages students to develop “critical consciousness” by examining

and challenging social norms and power structures in their society (Freire, 1970). More specifically, CFSE seeks to provide students with the knowledge and tools to recognize, critique, and ultimately transform institutional structures driving complex social, economic, and ecological issues within food systems (Tarlau, 2014; Meek and Tarlau, 2016). Meek and Tarlau’s (2016) CFSE framework integrates three expected learning outcomes for CFSE learners:

- *Agroecology*: Awareness of ecological design as an alternative to industrial agriculture, and the socioeconomic and political implications of an agroecological transition (Meek and Tarlau, 2016; Dale, 2021).
- *Food Justice*: Awareness of race- and class-based issues within food systems and the systems of power and oppression driving these issues (Meek and Tarlau, 2016).
- *Food Sovereignty*: Awareness of and integration with global movements for food sovereignty, communities’ right to access, grow, and define healthy and culturally appropriate foods (Meek and Tarlau, 2016; Sampson et al., 2021).

Though Meek and Tarlau (2016) emphasize that CFSE can be advanced “at diverse educational levels and across international contexts” (p. 241), the framework centers on learning in broad social movements and in higher education. Given the neoliberal forces which profoundly shape post-secondary institutions, Classens et al. (2021a), observe that CFSE in higher education may struggle to radically oppose the dominant neoliberal paradigm that has shaped food systems. One approach to advancing such counter-narratives in the face of these constraints, argue Classens et al. (2021b), is through *Campus Food System Alternatives* (CFSAs). CFSAs are informal student-run campus food projects that offer important pedagogical spaces where counter-narratives and education for food systems transformation can emerge simultaneously, by involving students in their local food system (Valley et al., 2018). These student-run food initiatives have been posited as spaces which can prefigure alternatives to conventional food systems by exposing students to grassroots action for food systems change in-practice (Classens et al., 2021b). Engagement in such prefigured alternatives can advance students’ hope and willingness to act for transformation for a more just and sustainable food system (Anderson et al., 2018; Dale, 2021; Ojala, 2022).

CFSAs are however not inherently radical nor critical. These student-run initiatives have drawn criticism on their potential for advancing depoliticized and shallow education about food systems, which can reproduce oppressive systems of white supremacy, colonialism, and classism if not actively resisted (Gray et al., 2012; Aftandilian and Dart, 2013; Green, 2021; Classens et al., 2021b). Scholars have also suggested that student-run food initiatives must seek to have a broad impact in the food system to advance learning among student participants that is truly complex, critical, and transformative (Barlett, 2011; Aftandilian and Dart, 2013).

CFSAs encompass a large diversity of student-run approaches to engagement in their campus food system, including campus gardens, student-run cafés, initiatives which distribute food to food insecure students, and more (Classens et al., 2021b). While literature on CFSAs recognizes their potential for transformative and critical learning, research has yet to analyze the diversity of different approaches to CFSAs and how learning experiences about food systems can vary in these spaces as a result. Simultaneously, literature focused on CFSE,

while clearly outlining expected learning outcomes related to agroecology, food justice, and food sovereignty, has lacked in-depth examination into the complexity of *how* food systems learning happens to advance these outcomes. Understanding how learning unfolds across a range of campus food system initiatives may offer important insights into their transformative potential, and the factors that enable or constrain this potential.

This study seeks to bridge these gaps in our understandings of the contributions of CFSA to CFSE by exploring how diverse approaches to student-run CFSA advance different learning dynamics for student participants and, therefore, varying degrees of critical understanding of and willingness to act for food systems transformation. We aim to offer insights on how CFSA activities and objectives can be approached such that they advance meaningful, holistic, and critical learning about food systems among student participants – who will then be equipped to become change-makers in food systems broadly.

Building on the theory and identified gaps in the literature on food systems education that we have presented, our research was guided by the following research questions:

- How does learning about food systems unfold for students participating in Campus Food Systems Alternatives on university campuses?
- What factors and activities in Campus Food Systems Alternatives allow participating students to gain an understanding of food systems that is transformative and reflective of Critical Food Systems Education?

2. Materials and methods

To understand and compare learning experiences about food systems in Campus Food Systems Alternatives (CFSA), we performed a multiple-case study analysis of four student-run CFSA at McGill University in Montreal, Canada. McGill University is a large public university based on two campuses: the main campus located in Montreal's downtown, and the agricultural Macdonald campus, a smaller, suburban campus (approximately 35km from the downtown campus) which houses the Faculty of Agricultural & Environmental Sciences.

Multiple-case studies allow researchers to gain an in-depth understanding of a particular phenomenon relevant and observable in each case (here, university students' learning experiences about food systems), while offering a more comprehensive and extensive picture of the phenomenon than single case studies and allowing for cross-case analysis (Stake, 2006; Hunziker and Blankenagel, 2021). In this study, cross-case analysis was used to understand how different learning opportunities within CFSA advance different degrees and manifestations of food systems learning which is critical and transformative.

2.1. Data collection methods

2.1.1. Mapping and recruiting CFSA

Prior to recruitment of CFSA for inclusion in this study, we created a database of the 16 identified student-run CFSA operating at one or both McGill University campuses. CFSA were categorized based on publicly available descriptions of their missions and objectives, obtained via initiatives' websites and social media pages.

Three categories of CFSA missions were identified when comparing activities across CFSA at McGill University: food production initiatives (e.g., campus gardens, campus farms); food distribution initiatives (e.g., campus food markets, student-run cafés); food waste diversion initiatives (e.g., composting). Some CFSA fell into more than one category, and CFSA activities extended beyond the campus to engage with members of the wider community.

To capture the diversity in CFSA's missions and activities at McGill University, and thus the diversity in learning experiences that different CFSA afford to student participants, we approached two CFSA from each category to participate in the study. We selected which CFSA to approach based on our assessment of their activity status (at the time of research, many CFSA remained inactive after COVID-19 restrictions were lifted) and with a view to including CFSA across both campuses. Four of six contacted CFSA agreed to take part in the study (Table 1). Two initiatives we contacted declined to take part due to capacity constraints following the lifting of COVID-19 restrictions.

2.1.2. Documenting learning and CFSA practice

Multiple qualitative data collection methods were used to investigate how learning happens in CFSA to advance critical perspectives on food systems. We undertook document analysis of each CFSA's website and social media profile, publicly available promotional materials, and student participant recruitment documents; site visits to CFSA activities during which we took observational field notes; and hour-long semi-structured interviews with participants from each CFSA ($n=8$). Document analysis and observational field notes from site visits provided contextual qualitative data on each CFSA's general activities. Semi-structured interviews with facilitators were used to deepen insights on each CFSA's general missions and activities and on student participants' personal learning experiences in their respective CFSA.^{1,2}

2.2. Data analysis

Qualitative data from CFSA documents and observational field notes from site visits were collected, compiled, and analyzed to gain a holistic understanding of the educational activities and opportunities available for students participating in each CFSA. Thematic analysis using methods described by Braun and Clarke (2006) was performed for semi-structured interviews using deductive and inductive coding cycles, first to identify evidence of learning in line with CFSE learning outcomes (Meek and Tarlau, 2016), and related learning theories, and then to identify emergent themes related to students' learning experiences about food and food systems.

Themes from across each of the four cases were compiled and compared to perform cross-case synthesis as described by Stake (2006). We searched for differences and similarities in themes across cases to identify trends in learning experiences about food systems across CFSA. General trends in learning experiences informed our model on the dimensions of learning experiences

1 Data collection was undertaken with McGill Research Ethics Board approval (certificate number: REB#22-04-114).

2 Our interview guide can be found in the article's [Supplementary material](#).

TABLE 1 Description of cases included in multiple-case study analysis.

	CFSA A	CFSA B	CFSA C	CFSA D
CFSA mission category	Food production initiative	Food waste diversion initiative and Food distribution initiative	Food distribution initiative	Food waste diversion initiative and Food distribution initiative
Primary campus of operation	Agricultural campus	Agricultural campus	Downtown campus	Downtown campus
Summary of activities	CFSA A is a campus ecological farm which follows a Community Supported Agriculture ^a model to distribute food to students, staff, and the beyond-campus community. The farm also sells produce to a subsidized farmer’s market which distributes subsidized produce to marginalized communities.	CFSA B collects food waste from a local grocery store and uses food waste to cook and serve free meals to students on a weekly basis.	CFSA C is a campus food market which operates weekly during warm months and hosts food vendors from the Montreal community.	CFSA D collects food waste from partner food distributors across Montreal and diverts it to a food bank serving underprivileged communities in Montreal. The CFSA also frequently hosts educational events about food waste for McGill students.
CFSA Participation Compensation	Student interns and managers receive seasonal stipend.	Student facilitators and volunteers are unpaid.	Market coordinators and other student executives receive seasonal stipend. Market volunteers are unpaid.	Student facilitators and volunteers are unpaid.
Students interviewed	<i>Student A.1: Second year Environment undergraduate</i> Farm manager and previous farm intern	<i>Student B.1: Food Science PhD student</i> President of initiative and previous volunteer ^b	<i>Student C.1: Third year Geography undergraduate</i> Market coordinator	<i>Student D.1: Fourth year Environment undergraduate</i> Co-president of initiative
	<i>Student A.2: Third year Environment undergraduate</i> Farm intern		<i>Student C.2: Third year Geography undergraduate</i> Market coordinator	<i>Student D.2: Fourth year Economics undergraduate</i> Co-president of initiative
				<i>Student D.3: Fourth year International Development and Economics undergraduate</i> Event coordinator

^aCommunity-Supported Agriculture is a model of food production and distribution in which consumers subscribe to a share of a farm’s harvest in a given growing season (Cone and Myhre, 2000).

^bOnly one student participant was available for interview at CFSA B since, at the time of interviews, they had lost their student base after three semesters of inactivity due to COVID-19 restrictions. The only participant in the CFSA was the student president who had been an active volunteer for the initiative before the COVID-19 pandemic.

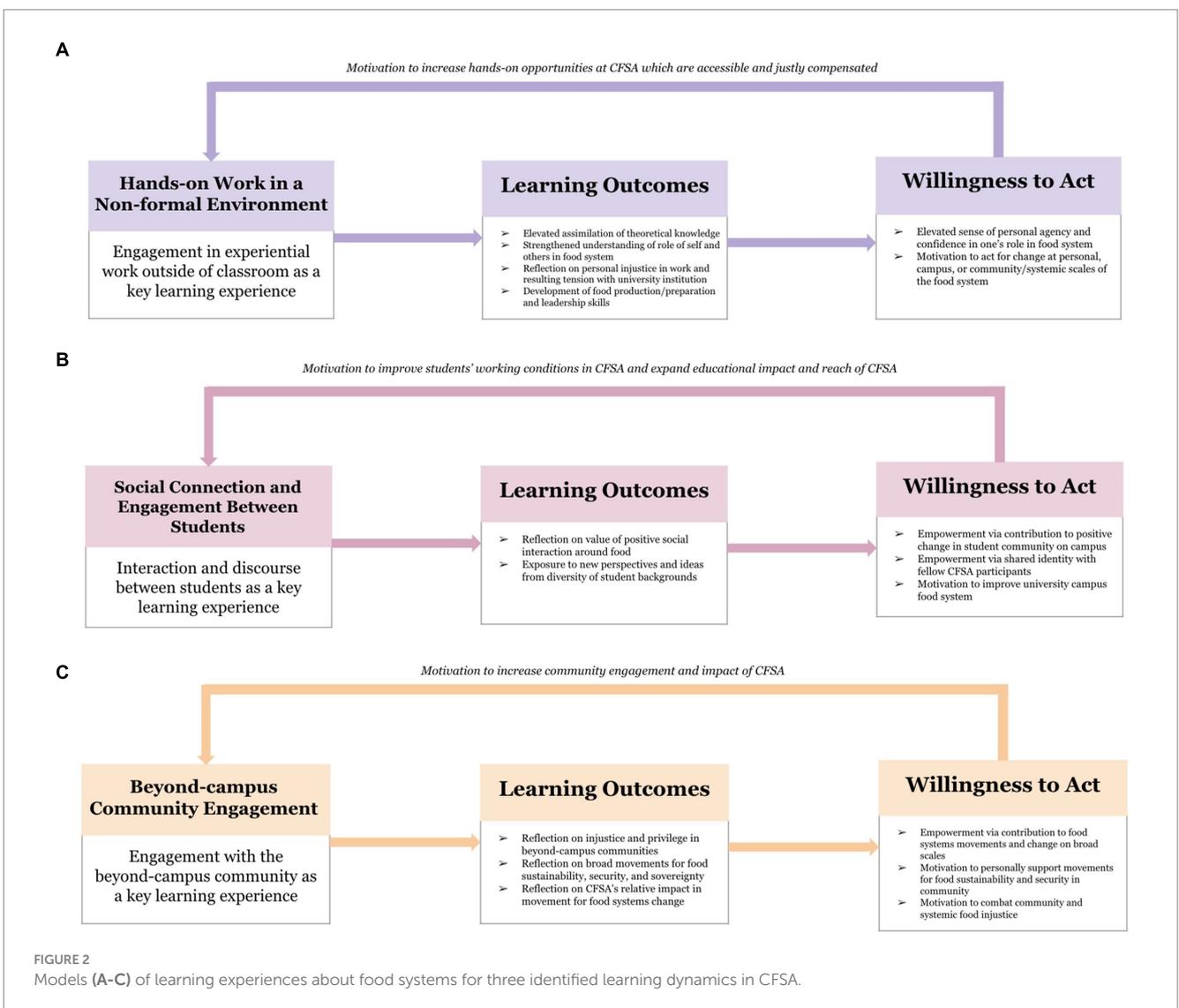
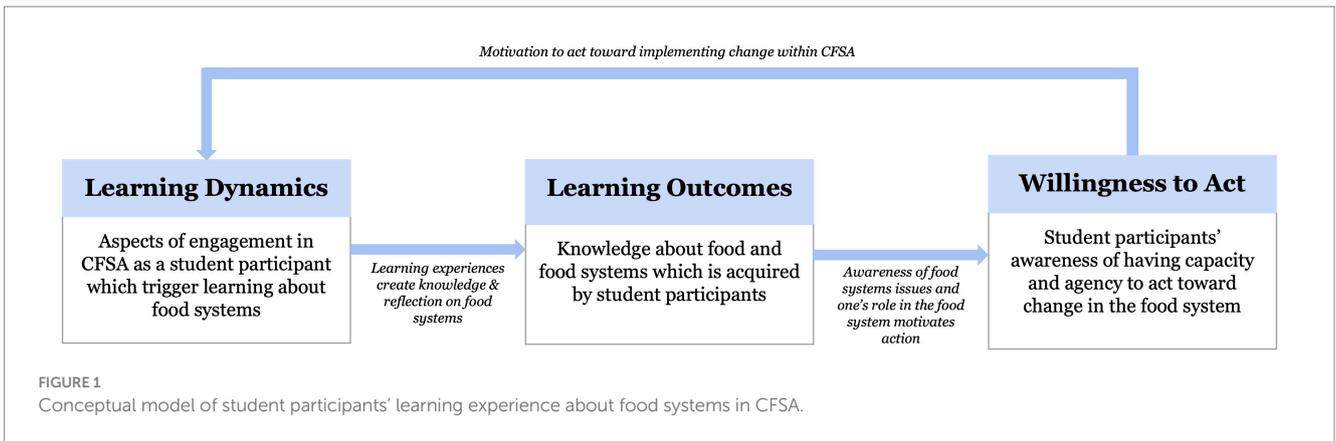
about food systems within CFSA (Figure 1), which then informed our categorization and interpretation of themes identified in our initial thematic analysis of interviews at the individual-case level. Comparison of theme categories across cases informed our subsequent learning experience models on three identified categories of learning dynamics within CFSA (Figure 2).

3. Results

3.1. Conceptualizing learning experiences about food systems via participation in a CFSA

Our first research question asked how learning about food systems takes place for students who are participating in CFSA. To better understand the learning processes that unfolded, we structured student participants’ learning about food systems in their respective CFSA into three interconnected dimensions of a holistic learning process: learning dynamics, learning outcomes, and willingness to act toward food systems change on multiple levels (Figure 1).

While students entered CFSA with varying levels of prior theoretical knowledge about food systems (see Table 1 for students’ educational backgrounds), students’ learning experiences within CFSA began with *learning dynamics*, which we define as engagement in CFSA activities which provide opportunities for knowledge acquisition and/or reflection on food systems. We term the resulting knowledge or awareness gained about food, food systems, and one’s role in the food system as *learning outcomes*. Learning outcomes were observed to often (though not always) motivate a *willingness to act* for change in the food system. We define this dimension as students’ awareness of their capacity and agency to act toward change within the food system, manifested as feelings of empowerment or personal motivation to enact change (at levels of personal change to campus-based change to beyond-campus community and systemic change). Willingness to act was occasionally observed to manifest as a desire to change the actions, activities, and/or missions of the CFSA one participates in, which can, in turn, lead to changes within the learning dynamics experienced by other student participants in the CFSA, as represented in Figure 1. These dimensions of learning experiences about food systems in CFSA informed our categorization and interpretation of themes that emerged both within and across cases, as we will explore below.



3.2. Learning experiences within individual cases

Since document analysis, field visits, and interviews revealed a

wide range in the learning activities that CFSA allow students to participate in, learning dynamics (defined above) unsurprisingly also varied across cases. Drawing on student interviews, the following results outline the CFSA's missions and student participants' learning

experiences, divided according to their associated learning dynamic. We have identified and described the learning outcomes and manifestations of willingness to act associated with each learning dynamic, to capture the holistic learning experiences of CFSA participants in each case.

3.2.1. Case a: student-run ecological farm

CFSA A's mission is to produce food with regenerative practices while simultaneously teaching students the skills required to manage a small-scale ecological farm. A primary goal of the CFSA is to become economically self-sufficient; the farm currently operates as a business, with revenue generated from CSA basket sales to members of the student and beyond-campus community. Participants described CFSA A as an experimental farm centered on learning, where hired students can translate theoretical agricultural knowledge gained in the classroom to hands-on ecological farm work and management experience.

3.2.1.1. Experience and observation of injustice within the CFSA

A key dimension of the learning that emerged from interviews were student participants' own experience of financial injustice within the CFSA, in which students felt unjustly compensated for their work as small-scale farmers. This led to critical reflection on the CFSA's financial and social sustainability (and the connection between the two) and a resulting sense of responsibility to improve the farm's compensation model such that it is more accessible and just for underprivileged students. Both students also reflected on how financial injustice within the CFSA appeared to be a result of tensions between the farm's focus on regenerative practice versus the university's profit-driven interests:

I would say that we [CFSA A] care a little bit more about sustainability and regenerative ways to grow food than McGill does. [...] We're not really a priority for them [McGill] at all. I know a lot of student farms at other universities have agreements with the cafeterias, so they can kind of get more permanent funding because they're strictly integrated into the school's food systems. Opportunities like that are something that McGill has really lacked. (Student A.2).

This reflection on financial injustice was also extended to the wider beyond-campus food system and the similar injustices faced by small-scale agricultural workers:

We're still trying to find a ways to make [CFSA A] more financially sustainable, which will really help in terms of social sustainability, because at the moment it's mostly causing exhausted team members who don't necessarily feel compensated for their hard work and not being able to seek any other form of employment because farm work will suck out all your time and energy [...] This seems to be something that keeps being repeated from farm to farm, especially the small-scale farmers that I know... it's always the same issue. (Student A.1).³

³ Quote excerpts from students' interviews were edited minimally to remove words like "um" or "like."

3.2.1.2. Engagement with the beyond-campus community

Student participants engaged with beyond-campus communities through weekly interaction with farm share basket members and produce distribution to a local food security initiative which subsidizes produce for marginalized individuals in the community. Engaging with these communities led to critical reflection on food inaccessibility and injustice in marginalized communities. Students described feeling empowered by the awareness of contributing tangibly to community food justice, and a resulting motivation to increase the financial accessibility of the CFSA's food and support movements for beyond-campus food justice, beyond the context of the CFSA. Student participants also felt that their engagement with the beyond-campus community shattered conventional producer-consumer barriers, allowing for a more holistic understanding of the food system.

3.2.1.3. Hands-on engagement in the food system

Student participants gained hands-on experience in food production through the CFSA, including field work, produce distribution, and administrative tasks. Students felt that this enriched the theoretical knowledge they gained prior to their CFSA work. One student also reflected critically on how hands-on engagement in farm work radically contrasted the formal food systems education they had received:

A lot of what I thought I knew about sustainable food systems was flipped on its side when I started working on the farm. [...]. I feel like there is this weird, estranged capitalist idea of what sustainability looks like, in order to sell things to people by making them look sustainable. I have learned the reason that exists is a symptom of the fact that no one is engaged with their own food systems, and so the idea of what sustainability really looks like is off. (Student A.2).

Participants described gaining a sense of confidence and empowerment from developing tangible food production and leadership skills. Their appreciation for hands-on work also motivated thinking about how to increase field work opportunities to more students on campus.

3.2.1.4. Transition to leadership roles

Hired students commit to two growing seasons of work, starting in the first season as farm *intern*, an apprentice-like role in which students are taught farming and leadership skills by managers, and progressing to a *manager* role in the second season. This transitional structure allowed students to develop practical leadership skills and assimilate and apply the knowledge gained as interns. This transition created feelings of independence, responsibility, and agency in student participants, resulting in a simultaneous sense of empowerment and confidence, and a motivation to take a leadership role in advancing food security beyond campus:

After [CFSA A], I do see myself working more towards working for food security organizations, or working at the center of a community [...] Yeah, to just empower people with knowledge. I find that something that I am really looking forward to explore more after [CFSA A]. (Student A.1).

3.2.1.5. Discussion and engagement with fellow students

Interactions between farm interns and managers were described as joyful, empowering, and crucial to the CFSA learning experience. One farm manager described deriving a strong sense of empowerment and pride from witnessing the personal growth of farm interns and from feeling like part of a long-lasting legacy of students in the CFSA:

I feel like I'm getting ready to see them [the farm interns] taking their first flight and it's so exciting. I get so emotional just thinking about it, because I'm so proud of the work that they have put in. They've soaked up so much information and they did it with so much joy. [...]. It fills me with pride of what we have done and what they will keep on doing and kind of like, keep moving in the future with that legacy that I was a brief part of in the grand scheme of things. (Student A.1).

3.2.2. Case B: food waste diversion initiative

CFSA B's primary mission is to bring students joy and community through tasty, free food. By preparing free meals for the student community on a weekly basis, CFSA B also seeks to raise awareness about food waste by showing students that expired or near-expiry foods can be used to prepare appealing dishes. The CFSA also seeks to teach its student volunteers cooking and creativity skills.

3.2.2.1. Discussion and engagement with fellow students

CFSA participants interacted with fellow participants, and with the wider student community via serving free prepared meals on a weekly basis. These social connections were described as particularly joyful on meal service days when participants witnessed fellow students' enjoyment of free food. This encouraged reflection on food as a conduit of joy and community-building, which resulted in a sense of empowerment and inspiration:

I would say the most empowering and happiest moments are seeing people enjoy the food we cook. That's the motivation behind me continuing being a president of [CFSA B] [...] I always find that it's inspiring, and our goal is achieved when we see people running for our food, because they know that we are serving food not only because it's free. It's for a purpose: to reduce food waste and to raise awareness of food waste. (Student B.1).

3.2.2.2. Exposure to volume of food waste in beyond-campus community

Student participants witnessed firsthand the volume of food waste delivered by the partner grocery store, which was described to be surprising and upsetting, and encouraged reflection on the unsustainability of conventional food quality standards that drive food waste:

In moments where I see the amount of food that is sent to us, I think about how it could basically just go into the trash instead of being eaten. That triggers me. It's so much. And this is only from one grocery store – could you imagine the amount of grocery stores around just Montreal itself? (Student B.1).

The student participant also reflected on the injustice and privilege involved in food waste in contrast to local food insecurity, which motivated the student to make personal changes to reduce their food waste as a consumer.

3.2.2.3. Hands-on engagement in food system

Hands-on cooking experience in CFSA B encouraged the participant to develop personal cooking and creativity skills and reflect on the value of experiential learning opportunities which contrast with formal classroom education. With these skills, the participant described feeling more comfortable to cook more to reduce their individual food waste. In coordinating the CFSA, the student participant also witnessed tensions between their student-run initiative and the conventional modes of food production and distribution on campus that the university supports financially. Particularly, the student described challenges with coordinating food preparation and service times with the university cafeteria that they shared space with.

3.2.3. CFSA C: student-run food market

CFSA C provides university students access to local and healthy food on campus, at affordable prices. The CFSA aims to empower sustainable local vendors and small businesses by connecting them to a market of buyers on-campus. In turn, the CFSA also seeks to connect students directly with food producers, to allow students to develop a closer relationship with and understanding of their local food system.

3.2.3.1. Engagement with the beyond-campus community

Student participants interacted closely and regularly with food vendors and urban agriculture initiatives from the beyond-campus community, leading to exposure to diverse cultural and socioeconomic contexts. This occasionally resulted in reflection on food-related injustice experienced by vendors on local and global levels:

[Interacting with one of our vendors from a marginalized background] made me think of how modern-day coffee picking is a relic of traditional, slave-based economic systems and colonialism. And how Quebec and Montreal can be a place that can start to pay reparations [by supporting marginalized food vendors]. (Student C.1).

Students felt inspired and empowered by contributing to tangible food systems change and supporting local sustainable food vendors, resulting in a desire to continue supporting local food systems with their buying power.

3.2.3.2. Discourse and engagement with fellow students

CFSA participants engage and connect socially with other student executives, volunteers, and visitors to the market, prompting reflection on the value of local food in community building and social connection. This leads to a sense of inspiration and empowerment from sharing similar ideas, passions, and priorities with fellow students. Social connection with fellow participants also created a sense of responsibility to ensure that all participants are compensated fairly for their work and dedication to the market.

3.2.3.3. Hands-on engagement in the local food system

Hands-on engagement in coordinating the market and distributing food on campus developed students' leadership skills and allowed students to feel that they were creating a fulfilling, tangible relationship with the local food system:

It is such a different relationship with fresh food [versus processed food]. For the same price, you can get something that's so much more valuable in terms of sustaining local economic systems and not having industrial farming be a part of how you're feeding yourself [...] Like you're so much more connected to the food you're eating and what you're putting in your body. (Student B.1).

Students' engagement with the local food system was described as developing their motivation to further support local food systems in their consumer choices outside of the CFSA.

3.2.4. CFSA D: food waste diversion initiative

CFSA D's mission is to collect food waste from food distributors in the local food system and simultaneously combat local food insecurity by diverting waste to underprivileged communities. The CFSA also seeks to raise awareness about food waste in the student community through a diversity of educational events about food sustainability.

3.2.4.1. Engagement with food insecurity in the beyond-campus community

Through deliveries of food waste to a local community food bank, student participants engaged with marginalized food-insecure communities beyond campus, prompting participants to confront their relative position of economic privilege as university students. Food bank experiences also encouraged students to consider the origins of food insecurity:

I would see exactly who I was delivering the baskets to and people were always so thankful. And for a moment, it was like, 'Oh, wow, I'm really doing something'. Then the second thought was like, 'Wow, why? How is it that one basket of food is making this person's day?' Like, this is such an easy thing to implement that this should be guaranteed. (Student D.1).

Students also expressed deriving a sense of accomplishment, empowerment, and motivation from contributing tangibly to increasing marginalized communities' food security:

Seeing the expressions of the [food bank] workers and the people who are waiting to be served – it just feels good that we're making a difference in those people's lives. Seeing the actual people that we're going to be supporting through our food is very personally rewarding and motivating because it makes us want to work even harder. (Student D.2).

One participant noted that the educational impact of the CFSA is limited for participants not involved in food deliveries who do not witness community realities beyond campus. This led to the participant's motivation to involve more students in food deliveries.

3.2.4.2. Exposure to volume of food waste in beyond-campus community

By collecting food waste from partner organizations, participants witnessed the volume of food discarded by food distributors. A sense of empowerment and accomplishment was derived from witnessing the amount of food waste collected and diverted by the CFSA, and students described a resulting motivation to increase the CFSA's food diversion and reduce their personal food waste. Exposure to food waste also prompted reflection on the need for systemic change to address food waste, given the limitations of consumer choice-driven efforts to reduce food waste and of the CFSA's impact on a broad scale.

3.2.4.3. Discourse and engagement with fellow students

CFSA participants engaged and connected socially with other student volunteers, executives, and participants in the CFSA, leading to new perspectives and critical reflection on food systems issues. One participant recalled meaningful discussions with fellow participants on how to maximize the CFSA's beyond-campus community impact, which encouraged reflection on how to support meaningful food systems change broadly. Social connection with like-minded students was also reflected on as a joyful, inspirational, and hopeful experience which made addressing food waste feel less overwhelming:

I think it's easy to get caught up in thinking 'Oh, well, I can't make a difference. What's the point of even trying?' [...] What I have realized is that you shouldn't try to give up; just try to connect with other people who are feeling the same way and [...] get yourself involved in something bigger so you don't feel like you're fighting alone. (Student D.1).

3.3. Cross-case analysis of learning experiences in CFSA

Returning to our guiding research questions on how learning happens in CFSA and the factors that enable transformative and critical learning, we analyzed and synthesized students' described learning experiences across cases. Comparison of student participants' learning experiences, and their associated learning dynamics, learning outcomes, and manifestations of willingness to act revealed similarities and differences in respective CFSA's advancement of critical and transformative food systems learning. More specifically, students' reported learning in Cases A and D aligned more significantly with the expected learning outcomes of CFSE than those of participants in Cases B and C. In both CFSA A and D, students reflected on social and economic issues within the food system as complex issues of injustice, a key dimension of the CFSE framework (Meek and Tarlau, 2016). These reflections appeared to be enabled by experiencing injustice in the food system – either personally (e.g., unjust compensation) or indirectly (e.g., engaging with marginalized and food insecure communities). In experiencing or witnessing injustice, participants in these CFSA also reflected on their personal role and the role of the CFSA in enacting change for food security and justice on community and systemic levels. Intentional critical reflective practice was however not observed to follow experiences of injustice in either CFSA.

Students' learning experiences in CFSA B and C were less reflective of the critical learning outcomes and willingness to enact transformative change expected in CFSE. In CFSA C, participants' reflections on food

systems were largely focused on local food vendors and their mission of providing students the opportunity to purchase local, healthy food from the market. This resulted in a willingness to act for change centered largely on consumer responsibility to support local food systems. Interactions with vendors from marginalized backgrounds did however create opportunities for students to reflect on systemic food injustice in CFSA C. In CFSA B, the participant, through witnessing the partner grocery store's food waste and students' enjoyment of their food, gained an understanding of food systems centered on personal consumer change to reduce food waste. Both of these CFSA's missions centered on shifting students' consumption patterns through food service; participants simultaneously emerged with a perception of consumer behavior as a key to addressing food issues.

Cross-case analysis and synthesis of within-case themes capturing learning dynamics also revealed that learning dynamics identified across CFSA could be grouped into three broad categories:

- *Beyond-campus community engagement*
- *Hands-on learning in an informal environment*
- *Social connection and engagement between students*

Similarly, cross-case comparison of themes related to student participants' learning outcomes and willingness to act revealed that these three categories of learning dynamics generated similar associated learning outcomes and willingness to act, which can be compiled and modeled as flowcharts (Figure 2) following the model from Figure 1. Depending on the respective missions and learning activities offered by CFSA, the extent to which the three categories of learning dynamics were observed in cases varied. It should be noted that while students across CFSA expressed willingness to act toward food systems change at various levels (including a motivation to change CFSA's compensation models in cases A and C), we did not see evidence of students translating these motivations into concrete action taken to change the systemic conditions they were working under. We suggest a need for a longitudinal study of students' learning experiences to assess if and how a willingness to act for change is translated into change within and beyond the CFSA (see Limitations).

4. Discussion and recommendations

Given the diversity in learning dynamics afforded by CFSA across cases, we attribute the varying extent to which CFSE was reflected in learning experiences to differences in learning dynamics enabled within CFSA. The three identified learning dynamic categories appeared to be particularly relevant and important here. We will therefore explore dimensions of these three categories of learning dynamics and how they advance different manifestations of critical and non-critical food systems learning, in the context of our findings and literature on environmental and food systems education and related pedagogical theories.

4.1. Hands-on learning in an informal environment

Hands-on engagement in food-systems-related work, outside of the formal classroom environment, was a key learning dynamic

identified in all four CFSA. First, these experiences allowed for elevated assimilation and reinforcement of theoretical knowledge that students had previously gained about food systems, in the classroom or elsewhere. As reflected by study participants, the application of theoretical knowledge to hands-on work has been found to be a rewarding and motivating factor in experiential food systems learning in higher education (Ahmed et al., 2018). Our findings also support that hands-on work beyond classroom confines provides many students their first opportunity to engage closely with their local environment, community, and food system. These beyond-classroom opportunities can challenge or expand students' previous conceptions of food systems gained in classrooms or mainstream media (Gramatakos and Lavau, 2019).

Close hands-on engagement with the campus (and beyond-campus) food system also allowed participants to gain a multi-dimensional understanding of the role that people (including oneself) play within the food system:

Learning like that [hands-on] is so much more multisided [than classroom learning]. Like, you learn about yourself, through learning about the world and interacting with the world. I feel like in my school life, I'm like, "I'm going to go to class and learn about the world". Then, "I'm going to go home and learn about myself." And I feel like the farm was a really great place to do both. (Student A.2).

Interacting closely with their environment and community via hands-on field work allowed participants to make sense of themselves and their surroundings in the context of working within a food system; this outcome of hands-on and informal learning has been identified as a key step in youth's development of critical consciousness of environmental and food systems issues, by giving them the opportunity to understand themselves as agents of transformative change within the food system (Delia and Krasny, 2018; Gramatakos and Lavau, 2019; McKim et al., 2019).

Hands-on work outside of the classroom also led students to personally experience the realities of injustice that result from working within the larger conventional food system, particularly in the context of working as a producer of alternative, ecological food (Case A). These personal experiences of injustice were especially important in driving students' critical reflection on the social, economic, and ecological dimensions of food injustice more broadly. By engaging hands-on simultaneously within the university's confines and in informal campus spaces, hands-on work was also observed to allow for students to witness, experience, and reflect on tensions between the CFSA's interests and actions and those of the university as a neoliberal institution which tends to oppose structural and radical change (Levkoe et al., 2019; Michel et al., 2020). Witnessing such tensions encouraged students to reflect on challenging institutional barriers to transformative change in the university and in society broadly. This observation reflects Barlett's (2011) assertion that campus food projects, when driving forward institutional change at the university, can be important "test sites" for students to become aware of and enact wider social change.

Finally, informal hands-on engagement in the campus food system allowed students to gain practical skills, from cooking skills to general leadership and group-work skills, a commonly observed outcome of experiential and place-based learning in environmental and food systems education (Aftandilian and Dart, 2013; Ahmed

et al., 2018; Valley et al., 2018; McKim et al., 2019). Although practical skills development was not observed to be directly tied to critical reflection on food systems in itself, our findings and related literature support skills development as a key aspect of CFSA which can build students' sense of personal achievement and self-confidence (Aftandilian and Dart, 2013; Delia and Krasny, 2018). These qualities are important in developing students' agency to take an active role in enacting transformative change on personal, campus, community, and/or systemic levels (Aboytes and Barth, 2020). This was particularly relevant in Case A in which student participants were provided opportunities to take on leadership roles within the CFSA.

4.2. Social connection and engagement between students

As student-led environments, the CFSA in this study were consistently described as spaces which facilitate social connection between students, which was a key driver of learning experiences in CFSA. Student-led learning in informal spaces like CFSA has been found to advance social learning between peers, in which students can create a sense of shared meaning and collective identity, an important feature of transformative learning (Gramatakos and Lavau, 2019). This was mirrored in our findings, in which students reflected on the positive social connections that they had formed via participation in the CFSA. Multiple students described how inclusion in a social environment of shared identity around engagement in the campus food system created a willingness to act manifested as a strong sense of empowerment, hope, and inspiration to contribute to food systems change:

I guess it's just great to see that other [participants in the market] not only think [the market] is important, but value it enough that they would spend time that they could use, like, chilling and doing school, being paid better in another job, to make [the market] possible. Yeah, it gives me a lot of hope. (Student C.1).

This shared identity and empowerment built around pursuing common goals has been identified as crucial to driving meaningful collective action, and simultaneous collective transformative learning among student-led campus groups like CFSA (Clark, 2016; Mejiuni, 2017).

Moreover, particularly for CFSA participants in leadership roles, social connections with fellow student participants were expressed to motivate a sense of responsibility toward peers to ensure that their CFSA work was being appreciated and compensated justly; in Cases A and C, where student work was compensated with seasonal stipends, this manifested as students' motivation to improve the financial accessibility and compensation models of their CFSA.

Discourse between students in CFSA was also identified to reveal new perspectives and ideas. Gramatakos and Lavau (2019) discuss how learning in informal student spaces brings together individuals from faculties which share little overlap, advancing opportunities for knowledge exchange between students with diverse academic perspectives. Knowledge sharing is considered an important step in building the social capital necessary to drive meaningful social change in groups, like CFSA (Blay-Palmer et al., 2016).

4.3. Engagement with the beyond-campus community

Engagement with communities beyond campus was key in developing CFSA participants' understanding of food systems in a context broader than the university food system. This was achieved, first, when beyond-campus community engagement exposed students to complexities in Montreal's urban food system and local movements for food sustainability, security, and justice. Awareness of these movements was observed to develop hope and inspiration within participants, and a resulting motivation to support these movements beyond the CFSA context. In giving students the opportunity to witness movements for alternative food systems and reflect on how their CFSA's mission connects to these, beyond-campus community engagement serves as a driver of CFSE's food sovereignty pillar (Meek and Tarlau, 2016).

Furthermore, when involving exposure to and involvement with community food injustice and insecurity (i.e., Cases A and D), engagement with the beyond-campus community encouraged complex, holistic, and critical reflection on food justice. In their reflection on beyond-campus community injustice, as well as injustice within the CFSA, students made explicit connections between intersecting social, economic, and ecological systems. Recognition of complex interactions between social, economic, political, cultural, and ecological systems has been identified as a signifier of transformative learning and critical pedagogy for environmental and food systems education (Delia and Krasny, 2018; Aboytes and Barth, 2020). As such, when community engaged, CFSA can advance transformative opportunities for students to witness the complex interplays between these systems on local, tangible scales (McKim et al., 2019; Classens et al., 2021b). This was observed to contribute to CFSA participants' sense of responsibility and agency to act toward community food justice. Theories of place-based learning identify that witnessing these systemic interactions on concrete, local scales, in which they are no longer perceived as abstract and decontextualized, allows systemic issues to be more tangible and less overwhelming for students (McKim et al., 2019). Michel et al. (2020) also compare students' engagement with injustice in marginalized communities as triggering disorienting dilemmas – important moments in Mezirow's (2000) theory of transformative learning in which new information activates students' critical questioning of past beliefs, perceptions, and expectations – which leads students to reflect on the systems driving community food injustice and creates motivation to act for change (Aftandilian and Dart, 2013; Michel et al., 2020).

Finally, beyond-campus community engagement was observed to encourage students' reflections on their positionality and privilege in the broader food system beyond campus. Participants in CFSA reflected on McGill University as a largely privileged environment where students are often alienated from community realities:

I think it's important, especially at McGill, which is a pretty wealthy university that is really well-resourced, you can get really isolated from Montreal and Quebec as a place that you're living in. And it just becomes kind of like the place you're going to school. I think food is a big part of changing our generation's understanding of and relationship with local food systems. (Student C.1).

CFSA can thus allow students from privileged backgrounds to “witness power, authority, privilege and oppression in the food system play out in the daily lives of others,” a key point in critical food systems learning (Valley et al., 2018, p. 12) Engagement with community realities *via* service learning has indeed been observed to allow students to realize their relative privilege in contrast to marginalized communities (Kiely, 2005; Gray et al., 2012; Aftandilian and Dart, 2013), an important driver of transformative learning (Kiely, 2005; Green, 2021).

4.4. Recommendations

The findings above describe the importance of hands-on engagement and social connection between students in learning experiences across all CFSA. However, these dynamics appeared to be less significantly tied to critical reflection on food systems issues than beyond-campus community engagement. This may be because neither hands-on engagement nor social connection between students necessarily involves exposure to, and thus, reflection on, food injustice and the systems that underpin it. CFSA work that is not rooted in challenging structural inequalities in the food system thus appears limited to advancing the shallow learning outcomes of conventional food systems education that scholars like Guthman (2011) warn against. Especially in the context of a largely privileged student body at a university conforming to an increasingly neoliberal model of higher education, *beyond-campus community engagement appears necessary for students to witness and learn critically about complex issues of race, class, and colonialism within food systems.*

In comparing learning dynamics afforded by CFSA, it is interesting to consider how CFSA engage the “politics of the possible” – one’s vision for political, economic, and social change – discussed in the context of CFSE and food systems transformation by Meek and Tarlau (2016). Different levels of engagement in the food system create different manifestations of politics of the possible within students (Blay-Palmer et al., 2016; Meek and Tarlau, 2016). When students are given opportunities by CFSA to contribute to addressing systemic issues on a community-wide level, their perception of what type of food systems change is possible expands beyond levels of personal change or campus-based change. Rather, students come to perceive broader change as possible, enabling the development of students’ motivation to enact the radical food systems transformation that CFSE advocates for. *We therefore recommend that CFSA work is embedded in community justice work and a locally grounded social change objective.*

It is important to recognize that a community-engaged CFSA will not necessarily advance CFSE; in line with critical service-learning theory, engagement with communities beyond campus, especially marginalized ones, must be approached carefully and intentionally to avoid extractive relationships which solidify oppressive power dynamics between marginalized and privileged communities (Mitchell, 2008; Gray et al., 2012; Andrée et al., 2016; McKim et al., 2019). Intentional background work is necessary for incoming participants to experiential community-based learning; students must be “provided with orientations to sensitize them to the issues of power, privilege, and respectful engagement before they enter into community settings” (Gray et al., 2012). Moreover, community

partnerships must be collaborative by involving reciprocal and mutually beneficial exchange of knowledge and resources (Andrée et al., 2016). Andrée et al. (2016) call for a “horizontal” approach to community-university partnerships for transformative food systems change, centered on building “just, healthy, and vibrant communities” (p. 144) by breaking down hierarchical power relationships.

CFSA must also integrate opportunities for student participants to engage in intentional critical reflection on their observations and experiences within the beyond-campus community. This intentional reflective practice was not directly described by students in any of the four cases. When asked to discuss if they have had meaningful learning experiences about food systems by engaging with their peers, one CFSA participant said:

I think we're just excited about being surrounded by fresh veg every week. At least I know, it's kind of nice to just be in the atmosphere [of the market]. But I don't know if we ever talked that much about our personal experiences with like, food and accessibility (Student C.2).

Critical and intentional reflection has been established as a necessary aspect of critical pedagogy and transformative learning. Freire’s theory of action-reflection posits that “if action is emphasized exclusively, to the detriment of reflection, [...] [it] negates the true praxis and makes dialog impossible” (Freire, 1970, p. 88). Other scholars have also highlighted the importance of dialog and critical reflection for ensuring that students’ observations of environmental and food-related injustice are contextualized in wider socioeconomic circumstances (Mezirow, 2011; Gray et al., 2012; Galt et al., 2013; House, 2014; Meek and Tarlau, 2016; Anderson et al., 2018). Given that we found CFSA to facilitate strong social connections and opportunities for dialog, we suggest that there is significant potential for integration of critical reflective practice between peers in CFSA.

Considering how these recommendations can be integrated into CFSA on university campuses brings to light numerous questions. First, do CFSA have a responsibility to contribute to community movements for food justice, and what is the educational value of CFSA that lack community engagement? Students expressed positive feelings derived from bringing joy to other students through CFSA action on campus, even when these actions were depoliticized and transactional. Barlett (2011) describes how campus food projects that are not explicitly radical or critical can still provide valuable opportunities for students to witness alternatives to the conventional food paradigm: “[A]lthough often phrased in positive, nonpolitical terms with examples of progress toward campus goals, [campus food projects] legitimize a degree of distrust for governmental, corporate, and academic reassurances about the conventional system” (p. 111). While not explicitly creating radical change-makers, these initiatives do still encourage students to build a closer relationship to food and food systems, which can lead to further questioning of and engagement in the food system. Moreover, engagement with joyful and hopeful environmental and food systems activities has been described as an important counterpoint to conventional “doom-and-gloom” environmental education that can debilitate students’ motivation to act for change. Conversely, positive social experiences in environmental and food systems education can motivate students to sustain, or activate, engagement in food systems movements (Ojala, 2022).

Second, who within CFSA is responsible for advancing intentional, collaborative, and critically reflective opportunities for engagement with beyond-campus movements for food justice and food sovereignty? Gray et al. (2012) identify formal educators as the typical actors who facilitate and guide students' reflective practice on issues of race- and class-based power, privilege, and oppression in food systems, through practices such as guided discussion and journaling. Classens et al. (2021b), however, warn against formalizing learning in CFSA given that much of their pedagogical value is in their advancement of student-led and hands-on informal learning. Food sovereignty activists have similarly warned against academic involvement in their movements given the tendency to prioritize knowledge produced by the university over knowledge built collaboratively with communities (Andrée et al., 2016). Moreover, in being student-led, we observed CFSA to be important spaces where students can experience tensions with the university's neoliberal interests, which can advance their reflection on and motivation to act toward institutional change. Formalizing CFSA thus risks undermining the radical potential of these initiatives. We recommend that researchers of food systems pedagogy explore how student leaders can become aware of critical pedagogical practice and integrate it into the structure and activities of their CFSA, without being compromised by the university institution.

5. Limitations

While this comparative case study points to opportunities for transformative learning in CFSA, our research design has limitations. This research is limited primarily by its small sample size of only four CFSA on one university campus, with 1–3 student facilitators interviewed per CFSA. Our small sample size was a result of the small size of these campus initiatives themselves. This is partly due to recruitment challenges faced by initiatives in having faced major restrictions on their activities due to the COVID-19 pandemic; at time of research, many initiatives were in their first months of activity post-pandemic. The small size of CFSA was also partly due to the temporary nature of student involvement in these initiatives given students' academic timelines. This study implies opportunities for larger cohort and longitudinal studies to deepen our analysis of learning within CFSA.

6. Conclusion

These four case studies of university students' learning experiences within Campus Food System Alternatives have revealed complexities in how engagement in student-run food initiatives on university campuses drives students' learning about food systems. Analysis of students' described experiences in CFSA revealed that learning experiences about food systems followed an interconnected model of learning dynamics, learning outcomes, and willingness to act for change in the food system (Figure 1). This model was used to generate three categories of learning dynamics, each with associated outcomes and manifestations of willingness to act (Figure 2), based on students' learning experiences across the four CFSA. These categories of learning dynamics illuminate why and how engagement in different types of CFSA led to differences in the reflection of

transformative Critical Food Systems Education in students' CFSA experiences.

CFSA were found to be spaces which consistently provide valuable opportunities for students to engage hands-on with their local food system and simultaneously connect with peers with whom they can create a shared identity around food. The observed connection between these learning dynamics and students' sense of confidence and agency to enact change suggest that hands-on learning and social connection in CFSA are key for laying the groundwork for creating change-makers among university students, an important objective of CFSE (Meek and Tarlau, 2016). However, for CFSA participation to be a motivator for students to enact transformative, radical, and systemic change, opportunities for witnessing and engaging with food-based injustice is necessary. The study's findings suggest that beyond-campus community engagement, especially with marginalized communities facing food injustice, is key to driving CFSA learning experiences which are critical and transformative.

As such, we suggest that student-run food initiatives, to advance CFSE for participants, must seek to expand their activities to include support and action toward food justice in the beyond-campus community in such a way that is intentional, reciprocal, and actively subversive to oppressive power dynamics. As discussed, CFSA must also integrate opportunities for intentional critical reflective practice among students, a practice which appears to be uncommon within CFSA. Our recommendations for beyond-campus community engagement in CFSA, with the goal of advancing CFSE among university student participants, align closely with Mitchell's (2008) framework of critical service learning, which describes learning for social transformation through collaborative and anti-oppressive community partnership.

Given limitations in our study's small sample size of four CFSA on one university campus, future research on student-run food initiatives could investigate if similar trends in learning dynamics are observable in larger and more diverse samples of CFSA. Longitudinal research is also needed to explore how students' willingness to act for food systems change is transformed into concrete institutional action. Moreover, our findings indicate questions on how CFSA can advance CFSE by integrating careful and critical community engagement and intentional critical reflective practice, without risking formalizing these spaces and reducing their radical potential. Further research is necessary on the complexities of how these spaces are led and coordinated by students, to find opportunities for student-driven leadership of Critical Food Systems Education.

Data availability statement

The raw de-identified data supporting the conclusions of this article can be made available on request to the corresponding author.

Ethics statement

The studies involving humans were approved by the Research Ethics Board Office of McGill University. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to

participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

ZD and BH contributed to the conception and design of the study. ZD gathered data and performed qualitative analysis and synthesis, wrote the first draft of the manuscript with subsequent editing, additions, and revisions from BH. Both authors contributed to manuscript revision, read, and approved the submitted version.

Acknowledgments

We thank Emily Sprowls and the McGill Leadership and Learning for Sustainability Lab group at McGill University for their support throughout this project. We thank the students in the participating campus food initiatives who contributed their insights to this study.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsufs.2023.1230787/full#supplementary-material>

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RECEIVED 26 June 2023

ACCEPTED 01 November 2023

PUBLISHED 17 November 2023

CITATION

Martens K, Rogga S, Hardner U and Piorr A (2023) Examining proximity factors in public-private collaboration models for sustainable agri-food system transformation: a comparative study of two rural communities. *Front. Sustain. Food Syst.* 7:1248124. doi: 10.3389/fsufs.2023.1248124

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Examining proximity factors in public-private collaboration models for sustainable agri-food system transformation: a comparative study of two rural communities

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Collaboration among local actors is considered an important precondition for a sustainable transformation of the regional agri-food system. To date, however, little is known about the social innovation capacity of local farmers when it comes to the establishment of alternative food networks. This is especially true for farmers' collaborations with local government officials, which are becoming increasingly important in establishing sustainability-oriented markets for local products and services, especially in the agricultural sector that is often rooted in rigid logics, supply chains and institutions. Therefore, this paper aims to explore the concept of proximity as an analytical lens to understand private-public collaboration models that aim at facilitating sustainable transformation in rural areas. Drawing on concepts from innovation geography, this paper considers the influence of geographic, cognitive, institutional, organizational and social determinants of collaboration, enabling an evaluation of the social innovation capacity of local private and public actors. This theoretical approach helps to disassemble and differentiate social innovation processes to determine success strategies. The paper studies two rural communities where mayors aim to establish local food stores with regional products and, therefore, seek collaboration with local farmers. While the empirical aspect of the study is limited, the two cases provide an opportunity to test the theoretical framework. The proximity approach can be significant for regional agri-food system transformation and steering social innovation processes by considering the distinct capacities of actors. Our conclusion is that the examination of the absence and degree of proximity facilitates a better understanding of practical recommendations to promote agri-food system transformation.

KEYWORDS

alternative food networks, local farmer, short food supply chain, double mission, hybrid organizations, local governance, agri-food transformation, social innovation

1. Introduction

The sustainable transformation of the agri-food system is an urgent and challenging task because of its significant implications for global warming, nutrition, biodiversity and environmental degradation (Jungbluth and Demmeler, 2005; Schwarzenbach et al., 2010; Willett et al., 2019). The current prevailing agri-food system, long and still promoted by national and transnational public and private actors, has focused on ensuring sufficient food supply, resulting in rigid institutions, including the domination of a few agribusinesses worldwide (Gugerell and Penker, 2020). Sustainable transformation requires disrupting these rigid institutions to develop new practices (Olsson et al., 2014; Ziervogel et al., 2016). Researchers and policymakers are exploring various transformative pathways for the agri-food system, such as the adoption of bioeconomy (Friedrich et al., 2021), organic farming (Darnhofer, 2014), digitalization (Martens and Zscheischler, 2022; Zscheischler et al., 2022) and agroecology (Vicente-Vicente et al., 2023) to address these challenges. These approaches emphasize the need for innovation and particularly the emergence of new sustainable practices and organizational models to promote change.

Many studies suggest that systemic change has to transcend the narrow focus on technological innovation that has largely ignored the influence of society on innovation processes and their potential negative outcomes (Pol and Ville, 2009; Bock, 2012). Instead, change comes with new organizational models and particularly multi-actor initiatives, referred to here as social innovation (Blätzel-Mink et al., 2017; Chiffolleau and Dourian, 2020; Gugerell et al., 2021; Kump and Fikar, 2021). Successful social innovation is the result of a collective action process that introduces new practices to address social needs (Bock, 2016; Pel et al., 2020; Martens et al., 2021). Scholars have argued that collective action can help actors to lower the barriers toward adopting more sustainable practices and, thus, fostering sustainable transformation (Bodin, 2017; Hubeau et al., 2017). Consequently, collective action and sustainable transformation in agri-food systems rely heavily on people's capacities to initiate or cocreate processes of collective action. So far, collective action aiming at transforming agri-food systems has been identified mostly in urban civil contexts and related to new multi-actor initiatives, such as food councils or food hubs (Blay-Palmer, 2009; Mansfield and Mendes, 2013; MUFPE, 2015; Blay-Palmer et al., 2016; Doernberg et al., 2019). Another example of alternative food networks are new forms of direct interaction between consumers and farmers, such as community-supported agriculture, which are also mostly initiated by urban civil society and link urban and rural areas (Opitz et al., 2019; Zoll et al., 2021). Consequently, there is little research on how rural municipalities are preparing for agri-food system transformation.

In this paper, we will focus on the collective capacities of two related actor groups that have been rarely investigated as agents for strategic agri-food system transformation: rural local government representatives (mayors) and local farmers. The relationship between politicians and market actors (i.e., farmers) has predominantly been characterized by a clear functional division for decades: the public sector sets the framework conditions for the agri-food systems on a macro-scale; farmers and supply chain actors operate within the framework. However, more and more transnational and national governments in the global North are promoting the relocalization of agri-food systems as a strategy for sustainable transformation

(Hinrichs, 2003; Gava et al., 2018), which also puts the focus on local governments to address this issue and develop policies to meet the objective (Morgan and Sonnino, 2010; Cohen and Ilieva, 2015; Ilieva, 2017; Gugerell and Penker, 2020). With new challenges ahead, local governments are taking on a more prominent role and recalibrating the binary relationship between public and private actors (Martens et al., 2022). Furthermore, since food production is localized mainly in rural contexts, the strategic collaboration between rural mayors and local farmers is of particular interest (Favilli et al., 2015; Jaklin et al., 2015; Hubeau et al., 2017; Dubois, 2019; de Souza et al., 2021; Martens et al., 2022).

We propose the proximity approach as a conceptual framework to study social innovation processes aiming at sustainable transformation to shed more light on the social innovation capacity of rural public and private actors (Boschma R., 2005; Dubois, 2019). This approach was established by the French school of proximities and subsequently conceptualized by Boschma in the field of innovation geography (Boschma R., 2005; Boschma and Frenken, 2010). It analyses the effects of geographic, institutional, social, organizational and cognitive proximity on innovation. In fact, the approach is slowly gaining popularity in the agri-food system literature (Dubois, 2018). Here, it has been used primarily to examine the interaction between farmers and consumers. Dubois (2018), for example, has made an important connection between the agricultural and proximity literature by examining empirically the producer-consumer relationships of organic farmers in rural Sweden. It shows that even in the agri-food context, proximity can have multiple purposes that rarely emerge in isolation from one another but are in relation to one another. Dubois (2018) observes that one proximity can serve as an "incubator for other types of proximity." Gugerell et al. (2021) found that the attractiveness of community-based agriculture in Vienna can be supported by promoting cognitive and institutional proximity. In addition, Gugerell and Penker (2020) applied the proximity approach to study the transition paths of niche organizations and their networks, focusing on urban areas. Edlmann et al. (2020) used the proximity approach to examine the relationships between coffee farmers and restaurant owners and found that a lack of social relations and a power imbalance weakened business relationships. In another study, Dubois (2019) emphasized the impact of peripherality on farmers' ability to adopt new, more sustainable practices by applying the proximity approach to study the different stages of innovation processes. However, since different types of innovation require different determinants and because innovation context and territory have implications for innovation processes (Geldes and Felzensztein, 2013; Geldes et al., 2017), there is a need to explore whether the proximity approach can be used to study social innovation in local public-private collaboration models in rural areas. To the best of our knowledge, neither study has yet applied the proximity approach to understand rural public-private initiatives aimed at sustainable transformation of the agri-food system, nor has the applicability of the proximity approach been explored from the perspective of the social innovation capacity of different actors. This paper will, therefore, be guided by two research questions:

Can the proximity approach be used to study rural social innovation processes?

How can one describe and promote rural local public-private collaboration models that aim at strengthening sustainable agri-food system transformation?

The article begins with a conceptual framework that distinguishes between sustainable transformation and conventional innovations and reflects on the literature on social innovation capacities among the actors in focus: mayors and farmers. The proximity approach and related studies in the agri-food literature are then introduced. We use two case studies from southwestern Germany in chapter 4 to compare how spatially proximate local governments and farmers have developed and implemented social innovations in local agri-food systems, revealing divergent outcomes despite similar conditions. The article concludes with a discussion of the research question and a critical assessment of the suitability of the framework for this investigation.

2. Conceptual framework – enabling and understanding transformation within the local rural agri-food sector by applying the proximity approach

New institutions need to be created that provide solutions to secure our resources to enable a sustainable transformation (Folke et al., 2010; Ziervogel et al., 2016). Transforming the agri-food system is seen as a major challenge, as it is a cross-cutting sector involving many actors (Markard et al., 2012; Kump and Fikar, 2021) and, thus, requires a transformation of many subsystems at different spatial levels, running in parallel but on different time axes. The fact that production and consumption take place primarily in different locations, often spread across the globe, is seen as another obstacle. Accordingly, there is a trend toward the localization of agri-food systems that encounters shortening food value chains, reconnecting consumers and producers, and leading to a realignment of policy benchmarks by public sector authorities (Lamine et al., 2012; Chiffolleau and Dourian, 2020). This provides an opportunity to analyze rural local institutions and the social innovation processes that are involved.

Innovations are usually seen as outputs of large investments in industries or knowledge infrastructures, aiming at economic growth (Moulaert and Sekia, 2003; Shearmur, 2012, 2017) and are theorized primarily as a single entrepreneur's activities (Schumpeter, 1934; Hospers, 2005; Richter, 2018). Thus, social innovations that foster sustainable transformation – not only within the agri-food sector – seemed to be shaped differently and, therefore, deserve a more detailed look. Actors, for example, who seek innovations that lead to sustainable transformation face different obstacles than those who seek innovations that lead solely to economic growth.

Innovation processes are processes of knowledge generation that can lead to transformation. They also involve uncertainties that people are reluctant to face (Hannan and Freeman, 1977; Boschma R., 2005). At the same time, many scholars agree that innovation processes that drive sustainable transformation cannot be managed by one entrepreneur due to their complexity and all-encompassing nature (Ostrom, 2000; Bodin, 2017; Martens et al., 2021). Collaborative processes also carry additional potential for conflict – especially when interest in the stakes are high and the outcome uncertain (Vatn, 2005; Bodin, 2017; Davids and Frenken, 2018). Accordingly, social innovation aiming at sustainable transformation is a process of collective action that will simultaneously encounter resistance at various levels.

- Firstly, because they involve changes to which people do not like to expose themselves.

- Secondly, because they are processes of collective action and, thus, give rise to additional uncertainties and potential for friction; and
- thirdly, because they involve processes that are not aimed primarily at enriching private actors and, therefore, the intrinsic motivation of actors to act must be more complex (Ostrom, 2000; Vanni, 2014; Martens et al., 2021).

Understanding how to initiate and manage social innovations successfully is, thus, a key issue in promoting sustainable transformation. We argue that the quality of change processes depends on the social innovation capacities of the actors involved. By social innovation capacity, we mean the ability and willingness of actors to overcome the challenges mentioned above and, simultaneously, bring in and pool the right resources to initiate or actively shape change processes. Why we refer to private and public actors here has already been explained. In the following, we provide a summary of the discourse on their social innovation capacity.

2.1. Social innovation capacities of farmers¹

Farmers can generally be classified as private actors because they are independent individuals who offer products on the market to earn their income. Looking into the innovation literature, private actors are often still described following a neoclassical narrative. They follow the market principle, i.e., they sell their goods and services on the market and try to gain competitive advantage by introducing innovations in order to compete or be superior to other market participants (Hospers, 2005; Billis, 2010; Defourny and Nyssens, 2012). However, some studies have found that farmers' ability to innovate differs from that of other private actors. Farmers, for example, cannot easily relocate their assets to find a place with lower transaction costs. In addition, agriculture is considered a more traditional sector than other industries, which means that the location and traditions play a more important role, making it more difficult to turn to new structures and networks (Ben Letaifa et al., 2013). The market position of a farm is strongly related to its specialization (e.g., arable cropping, livestock, mixed farm, specialization in vegetables, fruit), which again is strongly determined through the geophysical settings (e.g., altitude, soil quality, water availability) and entails capital fixed to investments at the farm site. Specialization also implies path dependencies and can cause typical innovation barriers, such as labor resources, learning costs, technology fit, and skills and networking options (Weltin et al., 2021). Farmers' ability to innovate can also be hampered by the fact that they are closely embedded in and dependent on support from national and transnational policies. The individual farmer has little bargaining power in the prevailing system and its structures and is often ignored at the policy level when it comes to designing supportive policies for the sector and climate change mitigation, even when the policies are transformational (Martens and Zscheischler, 2022). However, when focusing on their social innovation capacity, it must be mentioned that farmers have long been familiar with the principle of collective solutions among themselves through the presence and dependence of agricultural

¹ Local farmers, farmers on small and medium size farms, family farms.

cooperatives, at least in technical solutions such as pooling machinery or in cooperatives in the supplier and processing sector (e.g., wine, fruit, dairy). Public tasks, such as support for economic, social activities or winter maintenance, in rural areas are often taken over by agricultural cooperatives because rural communities lack the resources (Wolz et al., 2014; Figueiredo and Franco, 2018; Schmidt, 2019). Thus, farmers do not only produce private goods but also provide public goods and services (Schaft and Brosig, 2020). Farmers are often one of the only economic actors that improve the resilience of local rural communities (Rivera et al., 2020), and hold an important role in landscape and environmental protection. Therefore, in terms of sustainable transformation, it is important to consider the multiple spheres of influence of farmers and understand how this affects their social innovation capacity when it comes to engaging in multi-actor initiatives.

Studies have found that farmers tend to prefer individualism and independent action when it comes to their business. Aubry and Kebir (2013) found that farmers are more likely to avoid joining collectively organized institutions that shorten the food value chain when they see other opportunity. This is consistent with Dessart et al.'s (2019) argument that farmers adopt new, more sustainable practices not because they are intrinsically motivated toward sustainable transformation but because they feel increasing pressure from the media, local civil society or retailers. Interestingly, farmers themselves, for example, see the greatest opportunities in the increased implementation of sustainable intensification solutions at the landscape level, which includes at least coordinated action, and no longer just at the farm level (Weltin et al., 2018). The communication, marketing and logistic requirements for collective action toward sustainable transformation are said to be very high and different from farmers' previous roles (Bruce et al., 2017; Charatsari et al., 2020; Chiffolleau and Dourian, 2020). However, the social innovation capacity of farmers also seems to depend on the type of farming. Jaklin et al. (2015) suggest that organic farmers particularly like to work with new alternative food cooperatives because they share similar values, accommodate farmers on pricing and offer flexibility. Chiffolleau (2009) takes a different perspective, arguing that joining alternative food production offers an opportunity for farmers to renew their relationship with consumers. More direct producer-consumer interaction in alternative food networks has been described as a reciprocal relationship to stabilize the economy of a farm by fulfilling needs of the farmers and the consumers, primarily through providing access to finance, land and produce (Opitz et al., 2019). That means that farmers participate in alternative food networks not only for the potential economic benefits but to strive for other values (Charatsari et al., 2020). These points indicate that farmers' motivations go far beyond monetary profit generation; they seek further objectives that might initiate or contribute to sustainable transformation. This brief overview of farmers' social innovation capacity does not claim to be exhaustive. Nevertheless, it is clear that farmers represent an important and sensitive target group if transformation is understood as an approach to institutional renewal.

2.2. Social innovation capacity of rural mayors

Rural mayors are public actors who manage public goods according to the principle of redistribution. Local governments are democratically legitimized by being elected for a fixed term in modern

societies of the Global North. During their tenure, they are obliged to follow rules for the pooling and distribution of tax revenues and other public resources assigned to them by virtue of their office (Billis, 2010; Defourny and Nyssens, 2012). These responsibilities for local governments differ from those of regional or national governments and vary from country to country. However, local governments often decide regarding public procurement following sustainability principles, construction projects and land lease and, therefore, have local power as well as tendering and purchasing power on the related markets.

It could be argued that, as stewards of public goods, mayors are responsible for managing transformation in the agri-food system and, thus, have a high social innovation propensity and capacity. To date, however, mayors in rural areas have rarely proven to be the drivers of such transformation. Rather, agri-food system transformation appears to be consumer-driven and "based on urban activism" (DuPuis et al., 2005). This shows the increasing interest of other actors in governmental tasks (governance) or even dissatisfaction with their work, which leads to support but also a loss of power of rural local government officials (Defourny and Nyssens, 2012). With this in mind, DuPuis et al. (2005) asked about raising the awareness of the issue of establishing local food strategies by asking "which local institutions are more successful in promoting democratic, reflexive localist solutions and which merely perpetuate local inequalities" (DuPuis et al., 2005). Similarly, Gugerell and Penker (2020) emphasize that a major challenge for alternative food networks is not to align with the dominant system that has been supported by the public sector for decades. Citing Boschma R. (2005), Grabher (1993) and Herrigel (1993), already points to a certain innovation problem when powerful actors are involved, as they may choose conservative solutions before supporting new institutions that could lead to a loss of power. The sustainability transformation of the agri-food system is a challenging task for rural mayors who are caught between an overarching agricultural policy, the influence of large agribusinesses and the management of other conflicting interests – including competing sustainable transformation issues, such as energy, housing and mobility.

Nevertheless, the literature indicates that the pressure and motivation to deal with environmental crises is increasing in local governments (de Souza et al., 2021). The demand for locally produced, high-quality food has increased dramatically particularly since the COVID-19 pandemic, pushing local governments to act (Cappelli and Cini, 2020; Kump and Fikar, 2021). Marsden and Sonnino (2012) recommend that policymakers should promote alternative food networks on a smaller scale rather than aiming to scale up existing initiatives, indicating that all mayors should feel responsible for actively engaging in or initiating agri-food transformation (Hinrichs, 2003; Cohen and Ilieva, 2015; Ilieva, 2017; Gava et al., 2018; Gugerell and Penker, 2020). The literature on the role and social innovation capacity of rural local governments in transforming the agri-food sector is rare. While most studies do not directly suggest that local governments take over this task, the need for facilitators, intermediaries or innovation brokers in this area is clearly stated (Kivimaa, 2014). Hence, rural mayors could act as facilitators and social innovation brokers, thus, build networks, take care of public fundraising, fill knowledge gaps between actors, develop strategies, build trust and long-term perspectives, and promote food literacy (van Lente et al., 2003; Howells, 2006; Dalziel, 2010; Kilelu et al., 2011;

TABLE 1 Proximities and characteristics (adapted after Boschma R., 2005).

	Specification	Too little proximity	Too much proximity
Geographical proximity	Physical distance	No spatial externalities	Lack of geographical openness
Social proximity	Friendship, experience	Opportunism	No economic rationale
Institutional proximity	Formal and informal norms and rules	Opportunism	Lock-in
Cognitive proximity	Knowledge background	Misunderstanding	Lack of sources of novelty
Organizational proximity	Structure and organization of collective action	Opportunism	Bureaucracy

Gugerell and Penker, 2020; Janssen et al., 2020). Dania et al. (2018) see local governments as particularly important because they typically have a broad network that can be essential for the success of new social innovation processes.

These are the reasons for our ambition to provide a conceptual framework that not only looks at specific social innovation capacities but also delves deeper into how (process of collective action) and why (reasons for engagement) such social innovation occurs.

2.3. Conceptualizing the proximity approach to understand new agri-food system collaboration models

The proximity approach enables the study of collective action between actors by identifying reasons why these actors collaborate (or why they do not). Boschma identifies five different proximity factors that can lead to the explanation of collaborations and, thus, innovations: geographic, social, institutional, cognitive and organizational proximity. It is important to understand that these proximity factors are not mutually exclusive, that they can occur simultaneously, or that one factor can replace or promote another factor. Many studies have demonstrated that the approach can be used to characterize innovation processes (Boschma and Frenken, 2010; Boschma and Martin, 2010; Geldes and Felzensztein, 2013; Geldes et al., 2017; Villani et al., 2017; Capone and Lazzeretti, 2018; Davids and Frenken, 2018). However, the proximity approach has been applied mainly to understand innovation in urban areas and, therefore, to understand the innovation capacities of actors of certain mainly urban-based industries or other knowledge infrastructures. To this end, we would like to engage in a discussion on how the different proximities can be applied to the study of social innovation to promote sustainable transformation. In addition to defining the proximities, we have provided additional considerations to align the framework with its new scope in “Geographic proximity to organizational proximity.” Applying the proximity concept not only serves to identify solutions to promote sustainable transformation in rural areas, but is also an important insight for the innovation geography literature that seeks examples of how spatial innovation operates alongside the innovations that generate patents and publications (Boschma R., 2005; Heringa et al., 2014; Capone and Lazzeretti, 2018).

2.3.1. Geographic proximity

Geographic proximity represents the physical distance between innovation actors (Howells, 2002). While short distances are supposed to favor knowledge sharing, networking, collaboration and innovation, long distances require more complementary proximities to achieve

closeness (Table 1; Boschma R., 2005). The notion that geographic proximity favors innovation and is, thus, a necessary condition for fostering innovation has long been held by many geographic theories of innovation, such as Porter’s cluster concept and other approaches to agglomeration economics (Moulaert and Sekia, 2003; Shearmur et al., 2018; Martens et al., 2021). Therefore, Boschma’s approach is interesting because it departs from this narrative and identifies other proximity factors that can lead to innovation even when actors are not operating in close physical proximity to each other. This also makes it interesting for the study of social innovations in rural areas, which are characterized precisely by a lower number of heterogeneous knowledge sources and actors (Shearmur, 2012, 2017; Martens et al., 2021).

In recent decades, farmers have established their economic relationships mainly through the market with actors rarely characterized by geographical proximity (de Souza et al., 2021). This implies that a shift to regional short food chains and, thus, contacts with actors in geographic proximity is a fundamental change, especially since the new collaborative partners are not only private actors, but also civil society and public actors with different objectives and knowledge bases (Martens et al., 2021, 2022). Geographical proximity between actors is a current theme in the literature on alternative food networks, especially to describe the relationships between producers and consumers. The focus is on face-to-face interaction, which is assumed to be more likely with higher geographical proximity (Whatmore et al., 2003; Dowler et al., 2009; Kneafsey et al., 2013; Mundler, 2022). Thorsøe and Noe (2016), for example, distinguish between producer-consumer relationships in physical face-to-face, mediated virtual and systemic contacts, without immediate geographic proximity between consumers and producers. It is interesting to note that the literature on relocalization often states that the greater the geographic proximity, i.e., which often means without intermediaries, the better the transformation of the agri-food system. There may be a contradiction here between scholars who study short value chains and those who seek to promote and study transformation processes, as it is said here that intermediaries are needed to manage the increasing demand and complexity of a transformation process. Dubois (2018) does not seem to see this contradiction, noting that alternative food networks need to create spaces for consumers and producers to allow face-to-face contact, as this is important to build trust among these actors. In this context, we also learn from other disciplines that direct contact between actors is crucial to foster the willingness to act together to preserve public resources (Ostrom and Walker, 1997). Improving geographical proximity promotes social proximity, which seems to be an important strategy for alternative food networks. These findings underline the link between proximity factors also in social innovation processes.

2.3.2. Social proximity

Social proximity describes the impact of trust built through friendship, solidarity and experience by repeated interaction. This proximity focuses on the relationship of the actors involved in the collaboration and, therefore, has to be measured on the microlevel (Hinrichs, 2000; Boschma R., 2005; Boschma and Frenken, 2010; Thorsøe and Noe, 2016). This notion comes originally from the social embeddedness literature, which states that economic collaborations are always integrated in a social context, impacting collaboration outcome (Polanyi, 1944; Granovetter, 1985; Uzzi, 1997). Trust between actors, for example, lowers the barrier to sharing informal knowledge that is important for innovation success and also lessens the perceived risk of conflicts, such as opportunism by one of the actors (Boschma and Frenken, 2010; Ben Letaifa et al., 2013). Additionally, Capone and Lazzarotti (2018) argue that there is a higher chance of initiating innovation with a friend than with someone unknown. However, as with all proximities, social proximity does not always lead to successful collaboration. It depends on “the optimal social distance [...] a balance between embedded relationships within cliques and strategic ‘structural hole’ relationships among cliques” (Table 1; Boschma and Frenken, 2010).

The pursuit of social innovation that promotes agri-food system change requires that actors have the capacity for social innovation, as described in “Conceptual framework – enabling and understanding transformation within the local rural agri-food sector by applying the proximity approach.” Several studies suggest that, for this reason, social proximity plays a special role as it strengthens the willingness of actors to participate in projects even if they are not primarily market-oriented (Figueiredo and Franco, 2018; Martens et al., 2021). Pretty (2003), for example, notes that when social proximity is present, actors have the trust to invest in collective activities because they feel confident that others will do the same. Other studies suggest that social proximity between consumers and producers lead to an appreciation and recognition of the origin and quality of food, which is an important incentive for farmers to participate in short food chains (Murdoch et al., 2000; Watts et al., 2005; Milestad et al., 2010; Forney and Häberli, 2016; Thorsøe and Noe, 2016; Dubois, 2018). Forney and Häberli (2016) and others even see social proximity as a driver of relocalization rather than geographic proximity, as the distance between producer and consumer can be bridged by social proximity (Renting et al., 2003; Aubry and Kebir, 2013; Thorsøe and Noe, 2016; Dubois, 2019).

2.3.3. Institutional proximity

The concept of institutional proximity has its roots in what North (1990) called macrolevel norms and values. Macrolevel institutions can be divided into formal institutions, such as laws and formal rules, and informal institutions, such as values and cultural norms (Edquist and Johnson, 1997; Hall and Soskice, 2001). Too much institutional closeness can lead to change-averse behavior in a region or system and create the impression that no change or collaboration is taking place (Table 1; Hannan and Freeman, 1977). A lack of institutions can lead to opportunism (Boschma R., 2005). According to Boschma R. (2005), the institutional environment must reflect some “kind of balance between institutional stability (reducing uncertainty and opportunism), openness (providing opportunities for new entrants), and flexibility (experimenting with new institutions)” in order to enable innovation.

Institutions enable collaboration and, thus, social innovations because they “create stable conditions for interactive learning” (Boschma and Frenken, 2010). More specifically, shared laws, rules, language, habits, routines or established practices facilitate collective action by lowering transaction costs and reducing uncertainty (Edquist and Johnson, 1997; Maskell and Malmberg, 1999). Collective action is easier when each actor knows the rules of the game and shares values and cultural habits (Zukin and Dimaggio, 1990). Interestingly, by providing an example for low institutional proximity, Boschma and Frenken (2010) refer to university-industry-government relationships, noting that in this context, different key actors operate with different sets of norms and rules (Etzkowitz and Leydesdorff, 2000). Hence, in our context, this might be the case when looking into rural public-private collaboration models.

Another aspect of institutional proximity needs to be highlighted when focusing on rural local communities. Institutional proximity also refers to legal rules, thus, this proximity factor also targets ownership and property rights (Boschma R. A., 2005). Looking at local public-private collaboration models, this might create a power imbalance because local governments usually have the power to distribute land rights, on which farmers depend in order to do their business. On the one hand, this creates a powerful tool for local governments to shape transformation in order to relocate land rights to alternative food network actors. On the other hand, it can lead to additional uncertainties for farmers and trust problems in the collaboration if the actors do not communicate at eye level. As trust based on common institutions is a key factor of this proximity factor and differs from trust based on social relations of the social proximity factor (Boschma R. A., 2005).

2.3.4. Cognitive proximity

Cognitive proximity is a concept that refers to the degree to which actors can understand, interpret and utilize new knowledge. This is because a shared knowledge base provides a better foundation for building and exchanging knowledge than when actors from vastly different backgrounds interact (Filippi and Torre, 2003; Broekel and Boschma, 2012). It is important to note that, as with other proximity factors, cognitive proximity can be excessive or insufficient. Nooteboom (2001) posits that excessive cognitive proximity occurs when actors possess similar knowledge bases, which limits their ability to teach each other and hinders interactive learning. Conversely, inadequate cognitive closeness, which can be termed a “cognitive lock-in,” arises when actors are unable to understand each other even though they share a common language, resulting in difficulties in communication and interactive learning (Table 1; Boschma R., 2005).

Regarding the transformation of the agri-food sector, the question arises whether the currently still dominant agri-food system has degraded rural areas into such a cognitive lock-in area. Accordingly, a strategy of relocalizing the value chain for more sustainable production implies that the number of different sources of knowledge must be regionally reintegrated. This point is also made by Lamine et al. (2012), who conduct research on short food supply chains and emphasize the importance of considering the diversity of actors. Following the idea of geographic innovation research, the introduction of new sustainable practices and short food supply chains could lead to follow-on innovations that ultimately drive change, as regions with many actors in different similar sectors can increase the number of innovations in a region.

2.3.5. Organizational proximity

Organizational proximity, as defined by [Boschma R. \(2005\)](#), pertains to the extent of shared relationships within or between organizations, and encompasses the degree of autonomy and control that can be exercised within these arrangements. Similarly, [Moore \(2006\)](#) characterizes organizational proximity as the nature of relationships among actors, ranging from loosely connected relationships marked by independence to highly coordinated and interdependent innovation ecosystems characterized by control and interdependence. The importance of organizational proximity in innovation processes is widely recognized as it can reduce uncertainty and opportunism, especially when social proximity and institutional proximity are scarce. [Nootboom \(1999\)](#) further asserts that it lowers transaction costs and enables collaboration through the establishment of collective action rules. The degree of organizational proximity can range from highly formal, such as within hierarchically structured firms, to highly informal, in loose networks without hierarchies ([Williamson, 1985](#)). Nevertheless, excessive organizational proximity may lead to excessive bureaucracy and hierarchy, thus, inhibiting intra- and interorganizational learning ([Saxenian, 1996](#)), while weak organizational proximity may result in insufficient control and coordination, impeding collaboration and innovation ([Table 1; Boschma R., 2005](#)).

Interestingly, [Nootboom \(1999\)](#) notes that “formal contracting is almost impossible when it concerns complex and long-term research collaborations in which it is difficult to determine and codify the activities to be undertaken and the expected returns” ([Nootboom, 1999](#); as cited in [Boschma and Frenken, 2010](#)). Although the present study is not focused specifically on research collaborations, it is worth considering whether this holds true for collaborations aimed at sustainable transformation, which may also involve complex and long-term processes. How can such collaborations be best organized? According to [Boschma R. \(2005\)](#), both flexibility and a certain degree of control is necessary for successful collaborations, which might be best covered by loosely coupled systems, such as hybrid organizational models providing access to complementary resources.

Therefore, models of public-private collaboration may have some potential to establish successful social innovations. However, some studies in the literature on alternative food networks highlight organizational issues. [Little et al. \(2010\)](#), for instance, noted that alternative food networks face maintenance problems due to a lack of legal and organizational structure. Additionally, [Kirwan et al. \(2013\)](#) identified free-riding, a common problem in many social enterprises ([Tavella and Papadopoulos, 2017](#)). The degree of coordination and control also differs based on the size of the alternative food network. Smaller networks tend to balance power better and can engage in fair bargaining practices regarding food prices with farmers ([Gaitán-Cremaschi et al., 2019; Lamine et al., 2019](#)).

3. Methodology

A comparative case study design was chosen to explore the conceptual framework and research questions further because it allows for an in-depth analysis of a particular phenomenon in its context ([Silverman, 2017](#)). The cases were selected because they were similar in important aspects, but had different outcomes at the time of the study (between 2021 and 2022). In both cases, the municipalities’

mayors played a central role in initiating a farmers’ shop in their community, offering, among other things, local food products. One initiative already had a commitment from a few farmers to collaborate and the other did not, which makes these two cases interesting to analyze using the proximity approach. To ensure the anonymity of the interviewees, little case-specific information is revealed here. The cases investigated are located in South Germany in two different neighboring/adjacent municipalities within the same district and, therefore, the cases share a similar contextual and biophysical setting. To ensure a close link between theory and empirical data, the research used an iterative approach based on the principles of grounded theory ([Walker and Myrick, 2006; Wagenaar, 2014](#)), i.e., the literature review and data collection phases overlapped.

The study used a qualitative approach with semi-structured interviews to examine the establishment phase of the two multi-actor initiatives studied. Data collection was conducted in three phases during July 2021, October–November 2021 and February 2022. Firstly, exploratory *in situ* interviews were conducted with the mayors of the two municipalities to gain an understanding of their role in the initiatives and the baseline situation. Based on the results of these interviews, the research focus was refined to examine the role of proximities in the foundation phase of the initiatives, as it was determined that both initiatives were still in that phase. In the second round of interviews, two to three farmers ([Table 2](#)) who were approached by the mayor to collaborate with the respective initiative were interviewed for about 1 h each to explore their perspective and role in the initiative as well as their relationship with the mayor. The sample size was limited due to the small size of the communities and the small number of resident farmers. In addition, two farmers who agreed to be interviewed later withdrew their decision (one for family reasons, the other because of personal objections to the initiative). The interviews were based on a predefined guide and were slightly adapted for each round. Interviews were recorded with the consent of the stakeholders and transcribed to facilitate data analysis.

The process of data analysis began with a transcription of the interviews, followed by qualitative content analysis using MAXQDA software. Coding was both deductive and inductive, with deductive codes each reflecting a proximity category and combined with inductive codes. The coding was reviewed and refined in several iterations to ensure consistency and accuracy. Finally, the coded data were analyzed thematically to identify topics related to the research focus on the role of proximity in the formation phase of initiative formation.

4. Results

In the interviews, we explore the extent to which mayors in rural areas and residential farmers are able to initiate multi-actor initiatives to promote sustainable transformation. Investigation results from two case studies with similar examples of mayors initiating local farm stores and seeking collaboration with local farmers allow us to explore this research question not only theoretically but also empirically. We have structured our findings along the five dimensions of proximity explained in “Conceptualizing the proximity approach to understand new agri-food system collaboration models” and will then summarize our findings, focusing on the theme of the social capacity of the two actors.

TABLE 2 Introduction of the case and collaborating partners.

Case name	Actor interviewed	Description
Village Confirm ¹ (C)		<ul style="list-style-type: none"> - South Germany - Approx. 4,000 inhabitants <p><u>Goals for the initiative</u></p> <ul style="list-style-type: none"> - Inclusion, education, visibility of local farmers, transparency of value chain <p><u>Current project status</u></p> <ul style="list-style-type: none"> - Collaboration with farmers is confirmed - Financing is secured - Structural preparation of the location is in process
	Mayor C	
	Farmer C1	<ul style="list-style-type: none"> - Family Farm - Farmers in the third generation - Cultivation of crops and fruits
	Farmer C2	<ul style="list-style-type: none"> - Part-time farmer (farm is run by two related farmers) - Farm was converted recently (formerly pig mast now crop farming)
	Farmer C3	<ul style="list-style-type: none"> - Family Farm (two brothers) - Market crops, corn, wheat (Previously also cattle and pig breeding and mast)
Village Waiting ² (W)		<ul style="list-style-type: none"> - South Germany - Approx. 11,000 inhabitants <p><u>Goals for the initiative</u></p> <ul style="list-style-type: none"> - Revitalization of the town center, neighborhood support, education and knowledge transfer, promotion of sustainable nutrition, strengthening of regional employers <p><u>Current project status</u></p> <ul style="list-style-type: none"> - Collaboration with farmers is yet to be confirmed - Plans for structural preparation of the location are available
	Mayor W	
	Farmer W1	<ul style="list-style-type: none"> - Family vineyard - part-time farmer
	Farmer W2	<ul style="list-style-type: none"> - Family farm - Direct marketing - Primarily potatoes

¹The name of the village referred to the current status of the public-private collaboration initiative. In this village, the collaboration between the farmers and the mayor was confirmed to the time of the interview. ²The name of the village referred to the current status of the public-private collaboration initiative. In this village, the collaboration between the farmers and the mayor had not yet been confirmed at the time of the interview. The farmers are interested, but want to wait for the further development of the project before making a decision, while the mayor waits for the producer to confirm their collaboration.

4.1. The role of geographic proximity in forming the rural public-private collaboration models

The interview statements showed that geographic proximity – meaning the physical distance of the collaborative actors – is not trivial. The actors interviewed indicated various distances as relevant to the success of the initiatives. Primarily, the distance of the farmers to the farm store was mentioned here. In addition, the distance to other relevant actors was addressed and the issue of regionalization. The direct distance between the mayor's office and the farms themselves was not mentioned. It can generally be applied that in both cases, geographic proximity between public and private actors is given because farmers are located in the same (village C) or close proximity to the municipality (village W).

Results show that the location where the initiative is to be established is important for the farmers regarding their decision to get involved. If the location is too far away and, therefore, the logistics

costs for delivering the products are too high, they are unlikely to participate in the initiative. The following quotes were especially interesting because they suggest that the initiative has to pay off at a certain distance.

I: "... does distance play a role for you in deciding for or against the project?"

Quote (Q) 1: Farmer W1.

"No, no. So for me not, because it is just 2 kilometers, 3 kilometers away. That's already good, so then I would now already be within a radius of 15, 20 kilometers of it. Anything further away would really be a pain threshold for me, because I would then also have a longer, time-consuming commute."

Q2: Farmer W2.

"So we are already driving for three-quarters of an hour. We also drive to [...], which is also three quarters of an hour. But further... [...] then it must be profitable."

However, the willingness to participate is also dependent on the products that the farmers grow. Interestingly, there seems to be a necessary distance for certain products, as one farmer says that it is better for his brews not to be sold directly on the farm, as certain customers might find it better to buy them where they can shop more anonymously. While other farmers would be interested in developing not only the local but also a regional market with their products and would be willing to deliver longer distances.

Another argument made regarding geographic proximity was that regionalization is becoming more important as transportation costs increase (Q3). Farmers show interest in supporting the collaboration initiative because it is a local initiative that helps supporting local businesses. One farmer especially emphasized that the project should collaborate only with farmers in the surrounding area and not with the big players that are far away (Q4).

Q3: Farmer C3.

“It used to be that transport did not really cost anything ... Now you realize again that transport is not such a matter of course. ... In other words, that regionalism can still live on the basis of economic efficiency. Well, for quite a while, you would not have believed it.”

Q4: Farmer W1.

“Personally, it would simply be important for me to first address the surrounding farms, whether this concerns winegrowers or organic farms or basically farms that produce goods, and not directly to large players that are perhaps a hundred kilometers away or 50 kilometers away.”

While not directly targeting the relationship between farmer and mayors, one interesting finding has been regarding the rural characteristics within the debate of sustainable transformation. The mayor in village C, for example, emphasized the importance of rural municipalities to steer change processes by saying “if we did not do it, nobody would do it.” In this particular case, he was seeking support from other social associations and got rejected with the explanation that the village was too far away from the bigger town where the social association was located.

4.2. The role of social proximity in forming the rural public-private collaboration models

In both cases, social proximity – defined as the impact of trust built by friendship, solidarity and experience through repeated interaction (see “Social proximity”) – between the mayors and farmers interviewed has been rather low. Social proximity could be identified out of primarily formal relationships with each other prior to the initiative. The interviewees did not refer to personal characteristics of the respective actor but reported, for example, relationships such as:

Q5: Farmer C1.

“we know him because he is the mayor” (C1) or

Q6: Mayor C.

“of course we know our farmers” (Mayor C).

In village C, however, there seems to be more exchange and, thus, an assumed higher social proximity, justified mainly by the fact that the farmers are located in the community and, consequently, there are frequent discussions about land claims due to construction projects or similar land lease issues between the mayor and the farmers. As a result, experiences and, therefore, social proximity is built primarily on existing institutional proximity (legal relationship due to administrative relations).

Q7: Mayor C.

“The entire town has a population of not quite 4,000, so, of course, we know our full-time farmers, who have always leased substantial parts of their farmland from the municipality.”

Social proximity with one farmer in village C is built due to past experience, because farmer C2 is a member of the municipal council and, therefore, meets the mayor on a regular basis in the local political arena. This farmer has also gained trust through good experience in the past as he and the mayor have already successfully initiated a project together.

The relationship in village W is different and suggests less social proximity between the mayor and the farmers. The mayor said that they have too few farmers in their municipality who grow vegetables and that he, therefore, has to rely on farmers outside the municipality. In the following quote, the mayor’s (or the initiative’s) distance from the farmers is also made clear by the use of language; he refers, for example (Q8), to the initiative group and himself as “we” and to the farmers as “the others.”

Q8: Mayor W.

“Those [i.e. farmers] from the market, of course, we know, and the others were named to us [...].”

In addition to the fact that mayor W cannot draw on shared experience with farmers through institutional proximity, there is also another reason to conclude that there is less social proximity in case W than in case C. One farmer interviewed reported on negative experiences with mayor W (or the municipality) in the past, because they wanted to sell their vegetables at the market in the municipality, but did not get the selling space required.

4.3. The role of institutional proximity in forming the rural public-private collaboration models

Institutional proximities refer to perceived formal and informal norms and rules that impact the success of innovations. Both parameters could be found within the cases investigated and seemed to be relevant (Boschma R., 2005). Concerning their willingness and motivation to collaborate, certain reasoning could be found that indicated institutional proximity and distance.

Different informal norms and values between farmers and mayors in our sample were particularly evident in the issue of communication. An institutional distance regarding how much communication is relevant or necessary between the mayor and the farmers seemed

evident, as almost all of the farmers commented on not knowing the current processes and stated that they would prefer more clarity, through either more direct communication or frequent newspaper articles. By contrast, both mayors seemed satisfied with how the process was going.

Another example in terms of informal values and rules is that the farmers reported that they feel responsible for their region (Q9).

Q9: Farmer C3.

"I would say that a farmer here also has a responsibility to the community. [...] You are out in the community every day. [...] We are well aware that we are not anonymous, yes."

Regarding formal rules and norms, it became apparent multiple times that administrative borders have a significant impact on the success of collaboration as it seems much easier to collaborate with farmers within the municipality than outside (Q10).

Q10: Mayor W.

"We have approached three concretely, and have, so far, a little restraint regarding the reactions, until it becomes even more concrete, so, until we also build. So, I think it is not problematic with [farmer W1], because we have them on our own territory. But we have farmers in the city area, but none who grows vegetables, apart from corn and wheat. Therefore, I have to go outside [the municipality's borders]."

Furthermore, analyzing the two cases, we found that most actors are still operating within their institutional frames. This became apparent in the previous quote, as Mayor W (Q10) argues that they have to look outside for suitable farmers instead of starting a process where local farmers will change and diversify their products. In addition, the farmers are mainly arguing with economic mindsets, for example, by referring to the natural law of the market (Q12). In quote 11, farmer C1 shared that he also received a request from a local supermarket to supply his products. He would choose the new initiative over the supermarket because the mayor asked him first, which indicates his standards. On the other hand, we can also see his hesitation because of the lack of profit. This refers to the high surcharge on the product price in the new multi-actor initiative, which is also partly carried by the farmers.

Q11: Farmer C1.

"[Supermarket] not yet, so there was also only a preliminary inquiry, but at the moment I'm putting [the initiative] first, because he [the mayor] asked me first [...]. Let us first see what comes out of it, because, of course, the sale in the [supermarket] is cheaper. Yes... It actually makes sense that you sell it where it's cheaper and where you (farmer) get more."

Q12: Farmer C3.

"It [farmer-shop] will not be an instant no-brainer. But that's the natural law of the market, and in the age of discounters, it's difficult."

However, one farmer in village C also sees an opportunity within the farmer shop to overcome institutional barriers and increase the acceptance for more sustainable products. He alters his production,

introducing and experimenting with lentils and would be keen to do the same with hemp.

According to the interviews both mayors follow a dual mission with their projects, wanting to establish an economic self-sufficient business model, while, at the same time, aiming at social purpose, such as social and spatial justice (Q13,14). The mayors in both projects present themselves as initiators of the project, but also frequently refer to a group ("we") in their narratives, although it remains unclear who is meant by this. The mayors' statements suggest that they are committed to the multi-actor initiatives and intrinsically motivated. In both cases, however, it was multiple reasons that ultimately led to the project, as shown in the following quotes (Q13, 14). Nevertheless, they were able to convince their local councils to commit to these initiatives and provide initial funding.

Q13: Mayor C.

"And in this respect, yes, the whole thing is the municipality. If we did not do it, nobody would do it."

Q14: Mayor W.

"Then there was a second impulse that we did two workshops on sustainable food and global justice, where we noticed that more people are dealing with this issue."

4.4. The role of cognitive proximity in forming the rural public-private collaboration models

Cognitive proximity refers to the background of the actors involved in the collaboration. In both cases, it is likely that a common knowledge base existed between both mayors and their farmers as they have similar regional knowledge. However, it can be assumed that cognitive proximity is greater in village C regarding knowledge about local conditions, since the actors live in the same municipality, in contrast to the actors in village W.

Furthermore, it is clear that there is a cognitive distance in both initiatives, since neither mayor has an agricultural background. From a farmer's point of view, the social innovation process would be easier if the mayor had had more agricultural knowledge.

Q15: Farmer C1.

"Well, I would say that if it was someone from the profession, it might be easier, then it would not be quite so pretentious, I would say. He imagines many things – how should I put this now – are simpler than they actually are."

The farmers' view of the mayor also show his suitability as a project initiator. Farmer C2, for example, unlike farmer C1, attributes sufficient knowledge of agriculture to the mayor because the latter is very interested in a particular product culture. In addition, one farmer in case W mentioned that the mayor is well suited because he has a neutral position. If another farmer controlled the process, opportunistic behavior could occur, such as more advantageous product placement. Another argument was that the mayor is important because he has a good network. In addition it was argued

that a person coming directly from university would not be in the right position to steer such a process.

Focusing on how a farmer's social innovation capacity unfolds in this regard, two interesting perspectives could be found in the data. Mayor C, for example, states that public and private actors have different mindsets in this regard. Referring to the motivation to initiate such an initiative, mayor C mentioned:

Q16: Mayor C.

"...But for the farmers it is not: How do we make the world better? But: How can we bring about change for the position of agriculture, for their own business, and for their own lives here in the community?"

The second perspective is given by farmer C2, pointing toward the need for knowledge from other actors to drive sustainable transformation as suggested by Charatsari et al. (2020).

Q17: Farmer C2:

"Why am I doing this? – I myself do not want to do a farm store or anything. I see myself more as a crop farmer and also, I have to be honest, I'm not a baker, I'm not a grocer, I'm a crop farmer. What I can do is produce plants or produce plant products, that's where I see my motivation – to produce or produce top products, and the marketing or selling – that should be done by professionals."

While the mayors have no agricultural background, there are farmers in both municipalities who have gained or are still actively gaining experience with political offices. One farmer in municipality C is a member of the municipal council, and one farmer in municipality W held a temporary representative office and reported that there was also increased interaction with the mayor during this time.

The different cognitive proximities of the two cases allow for a further assumption as to why the farmers in village C have already agreed to collaborate, whereas this has not happened in village W at the time of the interviews. With farmer C2 on the city council, the initiative had an important mediator who was familiar with the bureaucratic office, the processes and the official language. The farmer appreciated the mayor and expressed his trust in him to other farmers, kept them informed and took up the farmers' concerns. This is also reflected in the comments of another farmer who referred to the farmer on the municipal council as the first source of information on the current status of the initiative.

4.5. The role of organizational proximity in forming the rural public-private collaboration models

According to the data, differences in organizational proximities – i.e. the structure and organization of collective action – can be observed. Village C has founded a nonprofit limited liability company for the implementation of the initiative. However, the farmers are not involved in this. According to mayor C, the collaboration with the farmers should be very loose and informal without contractual obligations, because he assumes in the interview that the farmers are deterred by this (Q18). Mayor C describes his

view on lowering the threshold for joining the initiative in the following quote:

Q18: Mayor C.

"But that we have a common brand image outwardly. And everybody said, 'Yeah, well, that's additional at the moment. This is an opportunity for us without having to commit to anything, without having to put money in, invest in anything, but it's worth a try to start this on a small area and then see how it develops.'"

I: *"So it's all been rather informal so far, without any signatures, so to speak?"*

Mayor: *"It will stay that way."*

In the case of village W, there is currently no business model, but according to the mayor, a citizens' cooperative is to be founded which is to establish the common and sustainable values (Q19). Contracts are to be made with the farmers.

Q19: Mayor W.

"Yes, I believe that it is a safety factor that the government is on board, as if it is now only, in quotation marks, a cooperative, because of course [...] especially when something new is started, there is a certain risk associated with it."

In both cases, interviews suggest that almost all farmers are found not to be fully engaged with the initiative. They are hardly involved by the mayors in any communication or social innovation process, and are seen more as a by-product that the initiative will deal with in due course. This triggers dissatisfaction among the farmers, which is evidenced by many unanswered questions and repeated statements of not knowing. In addition, the farmers' detailed speculations about the project make it clear that the mayors do not make use of important sources of knowledge (Q20).

Q20: Farmer W1.

"So I do not have the current concept in my hand. I would not know now if it's runs then, if the employees are paid by the municipality, if the farmer shop is then self-supporting, if it's done by volunteers, if it's done by those who display their products in a community. I do not have the knowledge of what is being talked about."

5. Discussion

5.1. Can the proximity approach be used to study rural social innovation processes?

We aimed at finding out with this study whether the proximity framework is suitable for studying social innovations that aim to promote sustainable transformation within the agri-food system. Based on the conceptual considerations, and two case studies, we demonstrated that proximity analysis is a valuable tool for accessing social innovation processes aimed at sustainable transformation. Through the empirical work, we were able to show how social innovation processes differ. In addition, we were able to

identified reasons explaining their different outcomes (farmers who have agreed to cooperate compared to farmers who have not yet committed). Based on these results, we summarize that it is possible to recommend alternative strategies to promote current and future social innovation in rural areas.

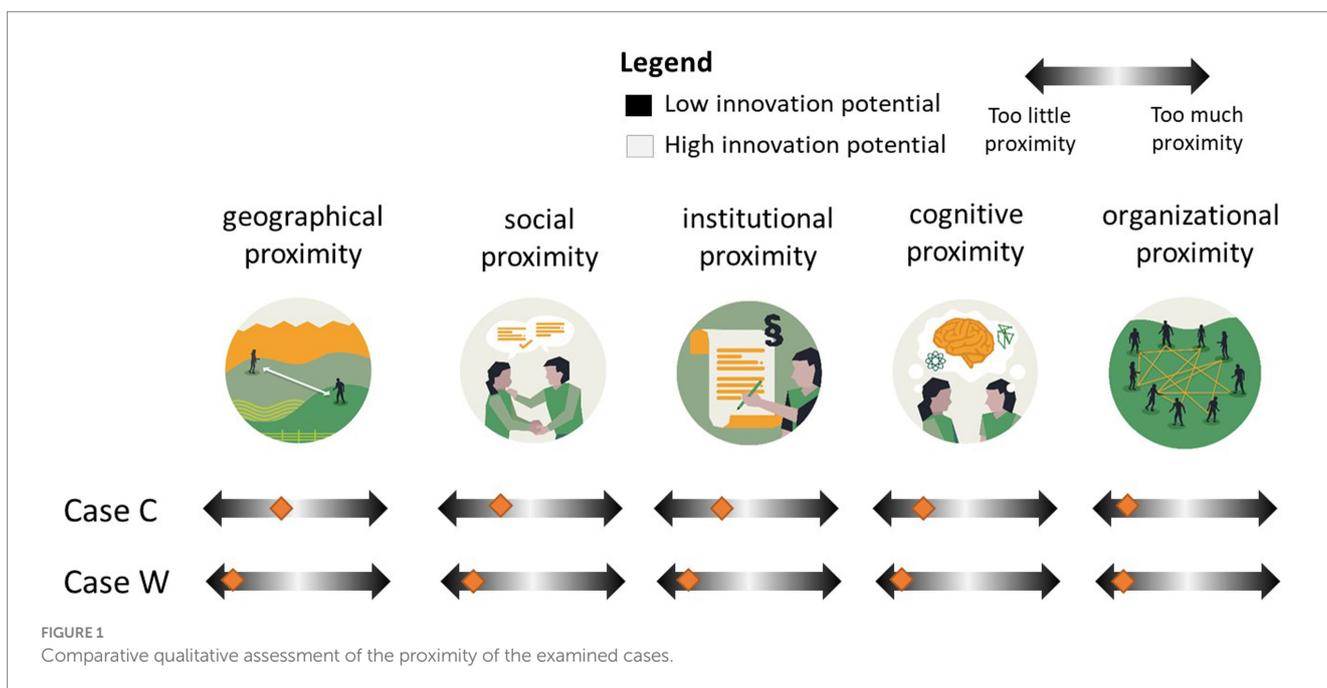
Both cases have different manifestations in the five proximity areas. They were still under development at the time of the study. It should be noted that the cases had different and diverse goals, as indicated in Table 2, and that in the analysis we looked specifically only at the farmers' interaction with the mayors on the question of whether you could imagine working together for the project. Overall, none of the respondents had major doubts about the general success of the overall initiatives. Therefore, both cases are rated with a fairly high innovation potential (Figure 1). In addition, Figure 1 illustrates that both social innovation processes are more under- than over-expressed in all proximities. This seems logical in view of the loose cooperation and lack of communication that we have identified (Q 18, 20). We have found in all categories, however, that it is possible to increase the degree of proximity between the actors involved or, if this is not possible, to replace it with other proximity factors. We will now discuss our results using a few proximities that we consider to be of particular interest.

Social innovation processes that promote sustainable transformation in rural areas vary depending on the actors involved and the characteristics of the place (Martens et al., 2021). Accordingly, we consider it relevant to discuss how flexible the proximity approach is in order to apply it to other regions and sectors. We note from our study that there appear to be multiple proximity pathways for successful social innovation. The geographical proximity between the given public and private actors, for example, can hardly be improved in our cases, since the actors are tied to their place due to their function (mayor) or their business (farm). However, geographical proximity has been found to be a significant success factor in Case C, as it is coupled with institutional proximity. This includes factors such as administrative boundaries

(Q5,6), familiarity with local leadership (Q6) and a sense of responsibility toward the community (Q9), all of which have been identified as crucial conditions for the success of social innovation among farmers, and possibly explains why farmers in Case C have already committed to the project. This social innovation pathway is not open to Case W because the farmers do not belong to the same municipality for which Mayor W is responsible. It will be crucial to establish a sense of belonging through other forms of proximity to compensate for this identified disadvantage. Accordingly, a different proximity pathway could be chosen in case W, which may involve more transaction costs.

We assume that organizational proximity holds considerable potential for promoting social innovation processes. Geographic and institutional proximity have limited dynamics, as explained earlier, and the impact on social and cognitive proximity is also marginal, as the number of key actors who can bring about sustainable transformation in a rural context is limited. Thus, personal and professional understanding between these key actors is not necessarily inherent. Conversely, organizational proximity may be actively desired by these actors and lead to the establishment of transparent cooperation guidelines, resulting in good social innovation governance (Martens et al., 2021). Moreover, the cultivation of organizational proximity can facilitate the emergence of other forms of proximity, including social and cognitive proximity.

In contrast to our initial assumption, we identified limited social proximity in both cases, as the actors involved did not exhibit close interpersonal connections ("Social proximity"). Our conceptual framework postulated that actors with close personal ties would be more inclined to invest the additional effort necessary for social innovation. Our empirical findings support this proposition. The case of the individual farmer in Case C vividly illustrates the importance of an intermediary who maintains close relationships with both groups of actors. Case W demonstrates that it is feasible to navigate social innovation processes without relying heavily on social proximity. However, case W also indicates that such endeavors pose



greater challenges for the local actors responsible for driving the transformation.

In conclusion, the concept of proximity also yields valuable insights into the meta-level of social innovation processes. The primary objective of this study was to investigate the factors that contribute to sustainable transformation. Among others, [Pel et al. \(2020\)](#) and [Ziervogel et al. \(2016\)](#) argue that such a transformation necessitates a dismantling of existing institutions and the establishment of new practices. These practices, aligned with the principles of social innovation, should be rooted in a collectively negotiated process that carries democratic legitimacy. The redefinition of norms and rules serves as a response to the influence of institutional proximity. Based on the concept of proximity, we would like to highlight two points that have emerged and prompted further reflection. Firstly, Case C underscores a notable shift in the power dynamics between the farmers and the mayor, particularly in the farmers' capacity as tenants of public land. Could the willingness to cooperate be influenced by this power dynamic? Can we call this a social innovation process? Is it a crucial lever for facilitating sustainable transformation, or is it in line with the arguments of [DuPuis et al. \(2005\)](#), who warn against an abuse of power by local elites? Secondly, it is evident in case W that the lack of specific types of farmers in municipality W, such as vegetable farmers according to mayor W, poses a challenge for the local transformation project (Q7). Breaking down existing institutions and fostering transformation here would be possible if the mayor sought collaboration with the farmers who are located in his municipality. This would require a profound change for farmers and thus a higher social innovation capacity, but would lead to the establishment of transformative capacities for the region in the long run. In terms of the sustainable transformation debate, these questions are worth discussion on a more political agenda.

5.2. How to describe and promote rural local public-private collaboration models that aim at strengthening sustainable agri-food system transformation?

This study examines models of collaboration among multiple actors, highlighting the diverse social innovation capacities of each actor. Based on the literature on sustainable transformation, collective action involving the pooling of resources from different actors is widely recognized as crucial ([Aubry and Kebir, 2013](#); [Jaklin et al., 2015](#); [Kump and Fikar, 2021](#)). We noticed a research gap in the agri-food system literature, as little attention has been given to understanding the functioning of collaboration or the reasons for its potential ineffectiveness, particularly in the context of public-private cooperation models in rural areas. In order to address this gap, we focus specifically on the capabilities that the actors under consideration possess and have identified three key arguments that highlight the challenges faced by social innovation actors. Firstly, the necessity to embrace and actively promote change. Secondly, the ability to withstand the uncertainty inherent in collective action processes. And thirdly, the prioritization of social impact over personal gain. By studying the social innovation capacities of public and private actors, we have improved our understanding of how collaboration among different actors and pooling of different resources can work to promote sustainable transformation in the agri-food

system. The most relevant findings are discussed here separately according to the groups of actors.

Our cases indicate that public actors (mayors) have the capacity to promote social innovation aimed at transforming agri-food systems. In both cases, the mayors used their networking and positioned themselves as patrons of the initiatives, creating legitimization for the topic in the community. They also retained their dominant position in the social innovation process and acted as initiators and drivers. Furthermore, public actors feel responsible for the provision of public goods and see this as their motivation for action (Q 13, 14). It should be noted that the mayors selected must be considered to have a high capacity for social innovation, as it is by no means normal for rural communities to engage with the agri-food system change and initiate alternative food networks. Especially since our results show that despite the fact that these are wealthier regions in Germany, mayors face obstacles due to the rurality of their communities. Exemplarily, they are deprived of important resources and cooperation partners from closer cities.

However, our study also highlights the importance of multi-stakeholder initiatives, as one group of actors alone can hardly manage the complexity of transformative processes. Despite the privileged access of mayors to networks, most farmers were not included in the different steps of the process and, thus, felt left out (Q18, 20). This lack of communication between public and private actors prevented the inclusion of valuable sources of knowledge that could be critical to the success of the initiative; especially because the social innovation output is to be a farm store and many of the farmers are already practicing direct marketing. Therefore, it can be assumed that farmers as cooperation partners have both the expertise and motivation to enter this entrepreneurial field (be present and grow) and should, accordingly, be integrated by public actors ([Weltin et al., 2021](#)).

Regarding the private actor and its capacity for social innovation, we can draw on the literature discussed in "Social innovation capacities of farmers" to identify some important characteristics. Specifically, the farmers show interest and appreciation in collaborating with other actors, recognizing that they perform important tasks for which they do not consider themselves qualified or interested (Q17; [Bruce et al., 2017](#); [Charatsari et al., 2020](#); [Chiffolleau and Dourian, 2020](#)). The farmers' statements imply that the existing social innovation capacity varies widely and is influenced, to some extent, by prior experiences and institutional affiliations.

Our findings indicate that farmers have limited social innovation capacity when it comes to the prioritization of social impact over personal gain. Farmers often appear to be constrained by system logics (Q 2, 11, 12), such as adhering strictly to market rules. Moreover, their reluctance to engage in the process also seems to be rooted in the recognition that social innovation, due to its collaborative nature, transcends individual decisions (which is often not the case with technological innovation). Consequently, there is a need to engage with new forms of networking and actors that may have had little to do with agriculture in the past.

Overall, the farmers interviewed indicated a willingness and/or interest in engaging with their farms to explore a novel model for local supply chains. This indicates that they have identified shortcomings in the current agri-food system or advantages in the alternative food networks offered to them, which motivates them to invest the necessary resources in social innovation. Therefore, this type of multi-stakeholder initiative can be a good strategy that leads to a new and

more sustainable agri-food system. This concept of relinquishing traditional roles and responsibilities during the collaborative process, followed by a subsequent redefinition and consolidation of innovative market orientations, has been explored by [Martens et al. \(2022\)](#) in the context of transformation processes in agri-food networks, particularly in organizational forms that exhibit characteristics of social entrepreneurship.

5.3. Study limits and recommendations

At this point, we would like to indicate some weaknesses of the studies and give recommendations for further studies that want to follow our approach.

The main purpose of this paper was to provide a theoretical framework for looking at sustainable transformation processes in rural areas, and particularly the interaction of public-private actors. Thus, the focus is on the conceptual elaboration of proximity dimensions in social innovation processes. The empirical underpinning has been chosen to test this concept. We are aware that the number of cases and the farmers interviewed in these cases is small. However, since there were only a limited number of farmers in the communities, this could not be overcome. Increasing the number of cases would have been at the expense of comparability. There is a need to accompany social innovation processes in more detail ([Dubois, 2019](#)), to show differences between different types of farming, how rural social innovation processes differ from rural-urban social innovation processes or possibly to identify success parameters using proximity analysis to better understand and promote the actions of actors in alternative food networks. Important contributions that can be built upon here are [Gugerell et al. \(2021\)](#) and [Gugerell and Penker \(2020\)](#), as well as the work of André Torre, which show further potentials of proximity analysis that now need to be explored for the field of transformative social innovation research.

We are aware that the topic of sustainable transformation is a complex one. Some authors question whether regionalization and the shortening of food chains are the right way forward. Although we are aware of these criticisms, we would like to note that our study aims to contribute to the debate on the role of regionalization of the agri-food system for sustainable transformation by adding important insights, namely those of local social innovation governance. We believe it would be useful to advocate for research on all potential leverage mechanisms that can bring about sustainable transformation. Another research gap in this context is an in-depth examination of the work of Elinor Ostrom and colleagues on commons resource management. It seems promising to see the extent to which their findings impact the field of social innovation research and what we can learn from their studies to study alternative food networks.

Finally, it should be emphasized that the case studies are rare, as the engagement of mayors in agri-food transformation is the exception in German rural municipalities. It can be argued that the task of promoting the agri-food transition is the responsibility of local publicly elected representatives ([Defourny and Nyssens, 2012](#)), as it touches on several issues of general interest, such as health, nutrition, landscape protection, biodiversity and job preservation. However, the agri-food transformation in Germany is not anchored in the tasks of local authorities and is, therefore, not a service of general interest as are many sustainability issues. Since the two case studies show how

important the institutional affiliation of a municipality is for farmers to become active and often no external actors feel responsible for sustainable transformation, this should urgently change and the lever for sustainable transformation should be politically anchored. The deficits of social innovation processes described, such as a lack of organization and communication, also raise the question of whether these competencies exceed the social innovation capacities of mayors and, therefore, require additional actors.

6. Conclusion

The following manuscript addresses the question of how the sustainable transformation of the agri-food system can work at the rural level. The theoretical elaboration looks at the role of multi-actor collaborations and particularly the social innovation capacity of local decision-makers and local farmers as a crucial factor of transformation that has been little explored so far.

With this paper, we create added value on several levels. Firstly, we create an argumentation basis for the different consideration and promotion of innovation and sustainable transformation by taking up and defining the idea of social innovation capacity. Drawing on arguments from social enterprise literature and other studies, we show that different groups of actors bring different capacities for participation in social innovations that initiate sustainable transformation processes. Conversely, these different actors also bring with them important resources that are necessary for sustainable transformation processes. Accordingly, the main question is how to successfully bring the different actors together and master emerging challenges.

Secondly, to bring together the different capacities and resources for social innovation at the local level, we propose the theoretical framework of the proximity level, which we also use as a methodological framework to operationalize the different levels of collaboration and, accordingly, identify strategies to pool resources to promote sustainable transformation better. Using this framework, we were able to show that there are differences in the way proximity shapes social innovation processes. In examining two case studies of municipalities where mayors sought to establish a farm store and, therefore, reached out to local farmers for collaboration, the application of the proximity framework provided a plausible explanation for why farmer commitment to the multi-actor initiative was lacking in one case. Organizational proximity and institutional proximity were too weak (no communication and different administrative affiliation) and were not improved by the mayor or replaced by other proximities. By contrast, it became clear that belonging to the same municipality lowers transaction costs at multiple levels and, thus, facilitates social innovation. This finding also underscores the importance of promoting rural communities as drivers of sustainable change, and anchoring and implementing the agri-food transformation as a service of general interest at the local level.

Data availability statement

The datasets presented in this article are not readily available because to protect the interviewees we are not able to share the interview transcripts. Requests to access the datasets should be directed to Katrin.Martens@zalf.de.

Ethics statement

Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

KM, SR, and AP: conceptualization, supervision, and writing—review and editing. KM: formal analysis, visualization, and writing original draft. AP: funding acquisition. UH: empirical investigation. KM and UH: methodology. SR: project administration. SR and AP: validation. All authors contributed to the article and approved the submitted version.

Funding

This research was funded by the German Federal Ministry of Education and Research (BMBF), grant number 033L221A-J, project name: “KOPOS: New cooperation for sustainable land use and food supply in urban–rural areas”.

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Acknowledgments

We would like to express our sincere appreciation to our interviewees for the invaluable insights and expertise they provided during the interviews. Their contribution greatly enhanced the quality and depth of our research. We are grateful for their time and willingness to collaborate.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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RECEIVED 29 November 2023

ACCEPTED 21 March 2024

PUBLISHED 04 April 2024

CITATION

Black JE (2024) Fun, community, and culture in a Japanese alternative food network. *Front. Sustain. Food Syst.* 8:1346129. doi: 10.3389/fsufs.2024.1346129

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Fun, community, and culture in a Japanese alternative food network

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Introduction: Alternative Food Networks (AFNs) are important sources of community-driven sustainable food production and consumption. It is apparent that despite the existing environmentally friendly ways of producing food, such networks are not yet multiplying at a rate which could help tackle climate change and biodiversity loss. This study is set in Sado island, Japan, which has become well known for its farming practices protecting the crested ibis, as well as its GIAHS status, but which also has an AFN beyond these accreditations. It investigates the challenges and opportunities of Sado's AFN to find ways to help it thrive, and give potential pointers for developing new AFN's.

Methods: In this research I use a mix of experiential sensory ethnography, socially-engaged art and interviews to understand the challenges and opportunities of an AFN in Sado island, Japan. A range of Sado's AFN actors were engaged to provide a more holistic picture.

Results: Young and new entrant farmers, food processors and retailers in Sado expressed the need for their work to be fun as well as in coexistence with nature, using innovative practices and models to make this a reality. AFN actors also revealed a great capacity to undertake numerous food and culture related events, for the purpose of community, throughout the year. Despite this, there are gaps in capacity, and a lingering negative image of farming and rural areas as difficult places to live. These factors are stemming the ability for new AFNs to begin and existing ones to thrive.

Discussion: Giving farming a fun, empowering and positive image whilst creating greater networking capacity could strengthen this AFN and help create new ones in other ruralities. Further, better acknowledging the importance of the culture and arts through which people connect to nature could form a greater source of pride and motivation to stay in rural areas.

KEYWORDS

alternative food network, community, human-nature connections, socio-ecological production landscapes, sensory ethnography, farming, rural revitalisation, sustainability

1 Introduction

Alternative food networks (AFNs) are often diverse by nature, in their actors' motivations, practices and the contexts in which they are situated (Holloway et al., 2016). Generally speaking, alternative food networks are alternative in that they seek to produce, process and sell food in a way that is different to what has come to be known as "conventional" agriculture and food systems, which are highly mechanized, grow crops as monocultures, use chemical

fertilizers and pesticides and often long supply chains (Beus and Dunlap, 1990; Ericksen, 2008). AFN actors are often motivated to increase local food, biodiversity, wellbeing and strengthen local communities, with an overarching aim of achieving greater sustainability (Michel-Villarreal et al., 2019). They are therefore vital in combating both climate change and biodiversity loss, while strengthening human-nature connections. In this paper, I use the definition of AFNs as including these aspects, with the understanding that they are heterogenous and that not all characteristics may exist within an AFN. For example, the physical location of an AFN may mean that even if the food is grown in a sustainable manner, it may have to be sold outside of the locality to be economically viable (Watts et al., 2005). AFNs often come with the presumption of being sustainable, however as with the “local trap”, this is not always true and it is important to be aware of areas where sustainability can be improved (Born and Purcell, 2006; Michel-Villarreal et al., 2019).

AFNs in Japan constitute several different alternative food movements. These consist of food system structures as well as those focused on production methods. “Teikei” (the Japanese predecessor of Community Supported Agriculture, “CSA”), is a structure defined by the close partnership between producers and consumers and has evolved its structure over time (Hatano, 2008; Kondoh, 2015; Kondo, 2021). Those which focus on production methods are numerous: organic (“yūki saibai” 有機栽培 or オーガニック) which allows some pesticides to be used as certified as safe by Japan Agricultural Standards (JAS) and must have this certified labeling; (“mu nōyaku” 無農薬) which does not use any pesticides; reduced chemical farming, including reduced pesticides and/or fertilizers (“gen kagaku hiriyō/kagaku nōyaku” 減化学肥料化学農薬); specially cultivated agricultural products, using pesticide and fertilizer reductions of 50% or less (“tokubetsu saibai nōsan butsu” 特別栽培農産物) and natural agriculture “NA”, (“shizen nōhō” 自然農法) which does not use any inputs (MAFF, 2008). NA was pioneered by Mokichi Okada, Masanobu Fukuoka and later Akinori Kimura, their practices stemming from ethnic and philosophical human-nature connection (Fukuoka, 1978; Miyake and Kohsaka, 2020; Kimura, 2023). This diversity of practices can make for a complicated alternative food system, with farmers unsure of which methods to use and consumers unaware of the differences or labels. However, it also allows officially recognized pathways for farmers to reduce reliance on chemical use, such as reduced chemical farming (RCF).

Within Japan’s agricultural system, Japan Agriculture Cooperatives (農業協同組合 “nōgyō kyōdō kumiai”, also known as JA or “nōkyō” 農協) has a long history and holds a lot of power. It was set up as a government-controlled farmer association and plays a prevalent role in selling farm produce, farm chemicals and machinery, giving advice and training, and in certification. JA is not always favorable in the eyes of farmers, however, as it often sells farm-use products at high prices and does not always support their interests (Freiner, 2019).

In multiplying AFNs and increasing sustainable farming, there are therefore a myriad of choices but also difficulties. Farmers need not only navigate the growing process but selling and marketing too. Declining rural populations and lack of farming successors also create a severe problem for the future of farming (Reyes et al., 2020; Usman et al., 2021). Within the food network, other actors such as food processors and retailers are also trying to find alternative means within the capitalist globalized system. These actors play an important role in using sustainably grown agricultural products,

interacting with customers and creating community within an AFN (Trivette, 2019).

Sado island is Japan’s sixth largest island located in the northwest Sea of Japan, with a range of ecosystems and produce of rice, buckwheat and a range of cultivated and wild fruits and vegetables. Its population has declined from 62,727 in 2010 to 51,492 in 2021 (Sado City Council, 2021). It has become renowned for environmentally friendly farming. In 2008, a certified brand of rice called “tokimai” (トキ米) was created by farmers, JA Sado and Sado city council in order to promote environmentally friendly ways of farming rice (e.g., reducing chemical inputs) to protect and increase numbers of the Japanese crested ibis (“toki” in Japanese) (Maharjan et al., 2022). As a result of this, it was given Globally Important Agricultural Heritage System (GIAHS) status in 2011 (Maharjan et al., 2021). GIAHS has similarities with satoyama and socio-ecological production landscape (SEPLS) concepts, which aim to promote human-nature relationships through managing land for both food, biodiversity and environmental health (Japan Satoyama Satoumi Assessment, 2010; Indrawan et al., 2014). Sado also has a network of organic and NA farmers, as well as a lively cultural arts and food calendar throughout the year.

In order to ensure the continuity of Sado island’s AFN, it is important to understand what support different actors need. This paper investigates Sado’s AFN, through a range of actors (farmers, food processors, retailers, politicians, and others), the importance of connections between these different actors and their needs in terms of support to strengthen and continue the AFN. Such an investigation, in an island setting in Japan, gives the paper originality.

2 Methods

This paper includes the results from 1 year living in and undertaking experiential engagement in an AFN with its communities and actors, on the island of Sado, Japan. It draws on socially-engaged arts (SEA) and EcoArts methods, in which the researcher situates oneself in a community in order to engage with people, discover issues and find pathways to solutions together (Helguera, 2011; Weintraub, 2012; Scholette et al., 2018). It is process-led, rather than outcome-led, and uses an organic approach to undertaking the process – allowing the situation, connections and events that arise to influence the direction of the research and therefore the results (Scholette et al., 2018). The “arts” element does not necessarily mean that there will be an end-product in the form of a more traditional art piece, but that the process itself is the form of art.

The methods also draw upon Pink’s theory of sensory ethnography, which adheres to a similar process and concept of reflexivity and experiential research. In understanding that experience is multi-sensorial, it allows us to access and understand social norms, relationships, cultures, ecologies in both body and mind through our senses. It is therefore perhaps not just a process of research, but also a process of living and growing oneself through such a research process. Through realizing this experience and the growth that comes with it, it can be a starting point for creating positive change and undertaking solutions to issues with the community around oneself (Pink, 2015, 2021).

These research methods all allow the building of relationships and trust within the community, and the experiential element of living in the study area allows opportunity for happen-chance encounters and

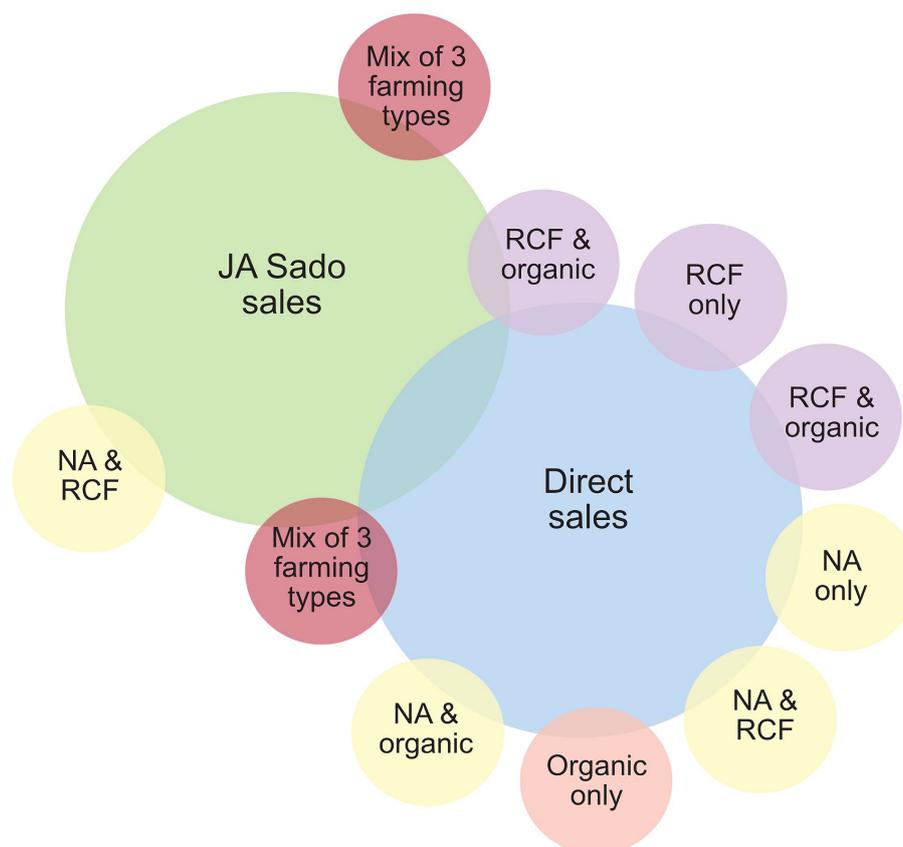


FIGURE 1

Schematic of Sado's AFN farmer types based on practice and what sales channels they use. Note, interviewees considered selling to online sales platforms, which show their farmer profiles, as direct sales. The schematic shows a varied landscape of farming practices and selling methods within the AFN.

experiences that would not otherwise occur. A deeper level of understanding and learning therefore takes place through these research methods, than more standard forms of social research such as interviews and surveys.

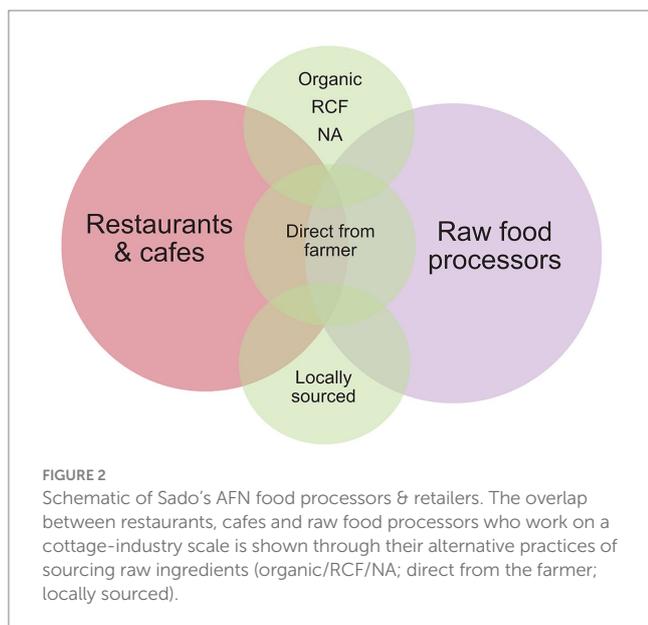
Further, the theory of relational studies and social network analysis demonstrates that people are relationally, intrinsically and instrumentally connected to each other and nature, therefore careful consideration of these connections has been undertaken in the research methods (Klain et al., 2017; Chan et al., 2018).

In order to support the experiential research, semi-structured interviews were also used to delve deeply into issues around support needs for AFNs. Questions included what support, challenges and opportunities farmers, food processors and retailers need and face in starting and then successfully continuing their sustainable practices (see [Supplementary material](#) for details). Interviews were conducted in Japanese. They were audio recorded as well as notes being taken at the time of the interview. A sample of the interviews were conducted with another bilingual Japanese-English speaker, to cross-check the interpretation of the responses. A network map was also drawn with each interviewee, in order to understand how they relate to different AFN actors in and outside of Sado. Alongside the interview questions and experiential ethnography, these helped to create [Figures 1–3](#), a representation of Sado's AFN. Each interview lasted between 1.5–2 h

and were held with a diverse range of AFN actors within the study site in order to get a representative dataset of the area. A total of 32 interviews were undertaken. The interviews stopped once a saturation point of information was achieved (Hennink and Kaiser, 2022). [Tables 1–3](#) show a breakdown of the interviewees, the characteristics which define their practices and demographics related to the study, such as I or U-turn¹ status. The tables are grouped into farmers (18), food processors and retailers (7) and other food network actors (7). The farmers, processors and retailers provided an insight into their specific practices, support needs, challenges and opportunities. The other food network actors provided an overview of the local, regional and national food system in Japan and some of the systems supporting the alternative food network in Sado.

After evaluating the interviews and experiential research, a workshop was held to present results and engage in discussion around three key themes arising from them (what local consumers in Sado want from farmers and processors, how to strengthen Sado's food network, and how to create a new image of farming for Sado). The

1 "I-turn" refers to people who have migrated to a rural area other than their or their parents' hometown or region, whilst 'U-turn' refers to those who have made a return migration to their hometown or region (Takeda, 2020).



workshop was held in Japanese by the author with two bilingual Japanese-English speakers present to help facilitate and verify the results following the workshop. Discussion ideas were written by participants and comprehensive notes taken by facilitators in real-time at each table during the workshop. The workshop served as both a validation of the results and as a step toward enhancing Sado's AFN. Participants totaled 22 (Table 4), 11 of which were previous interviewees (five farmers, two food processors, two Regional Revitalization Corps Officers (RRCOs),² one representative of JA Sado and one local university associate professor). The remaining 11 participants included Sado city council representatives, Sado “furusato nōzei”³ (ふるさと納税) promotion manager, and several other food processors and farmers.

Inspired by Kallio and LaFleur (2023), I start with a personal vignette from my time immersed in Sado's AFN. This experience included undertaking farming, participating in food events, helping to sell produce and find buyers, help to set up community spaces and be a performer at local traditional arts events. In tangent with the interview data, the vignette acts to create a more rounded, sensual, and rich account of Sado's AFN. This aids in better understanding its personality and atmosphere. The following section gives an overview

² Regional Revitalization Corps officer is a role created by the Japanese government and administered by local governments to encourage the movement of people from urban to rural areas to help revitalize them, through undertaking activities such as agriculture, forestry, fisheries, as well as developing, selling and promoting local brands and products (Ministry of Internal Affairs and Communications, 2015).

³ “furusato nōzei” (ふるさと納税) is a tax system implemented by the Japanese government in 2007 in which those living in urban areas can donate money to their rural hometowns, or rural areas of choice across Japan, to help support them in return for an income tax refund and a residence tax deduction if the donation exceeds a certain amount. How the donation will be used can be specified and a thank-you gift of local specialty produce can be received. This is therefore a selling point for local farmers and food processors.

of Sado's AFN to set the scene for the subsequent two sections which describe the response of three sets of interviewees: farmers, food processors and retailers and other actors of importance to the food network. These sections are split into the main themes that arose from the interviews. The discussion then considers the responses of the interviewees in light of what can be learnt from Sado's AFN for other areas, as well as how it can find ways to progress and strengthen into the future.

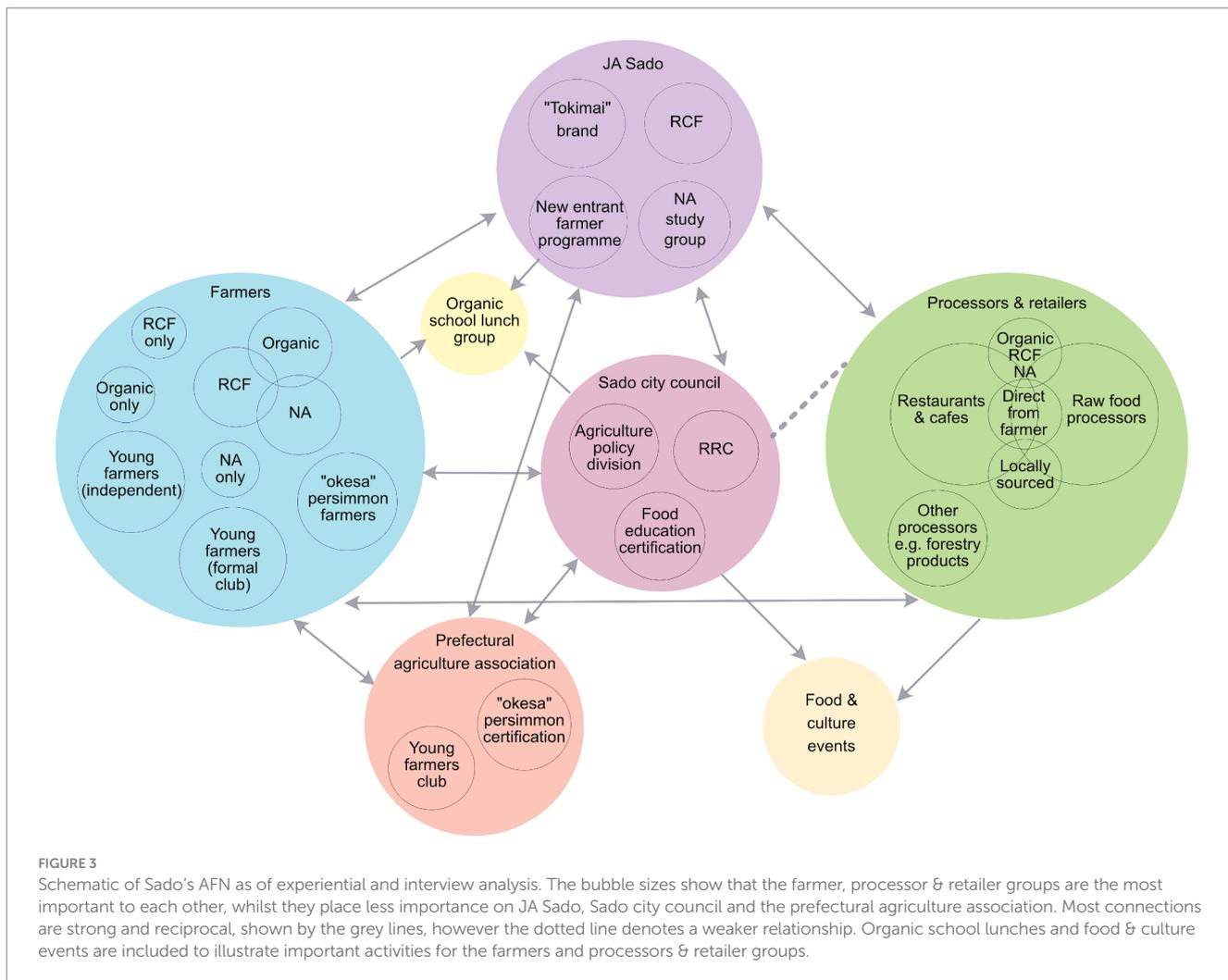
3 Results

3.1 An overview of Sado's alternative food network

From my 1 year of immersion in Sado's AFN, seeing the efforts of different actors come together to create numerous community food and culture focused events left a deep impression. These events blend tradition with small but radical acts of sustainability, in a society that has a lower awareness of sustainable agriculture than might be expected (organic only accounts for 0.2–0.5% in Japan compared to 1.4% globally), Willer and Lernoud (2019) and Miyake and Kohsaka (2020). As I experienced these active communities as a participant within them, they became more nuanced, and as a result I felt the need to support them became more pressing.

“As autumn leaves began to fall to the ground, I picked rosy ripened persimmons in orchards covering the mountain slopes. We took them to the small cottage-industry sized factory to peel and chop them for drying, packaging and selling. With a group of young U and I-turners, I helped move truckloads of rubbish from a vacant property they were transforming into a guesthouse for new young migrants interested in farming. As the spring buds began to emerge on branches, I squeezed freshly fermented soy sauce through a traditional wooden press with a group of neighborhood friends. I listened to careful observations of how it was saltier, a deeper umami flavor than last year, the beans still retaining their shape despite the fermentation process. As summer began to bloom, I walked with a local expert and groups of families around paddy field verges and forests to pick wild herbs to make teas and balms together. With a group from one of the local shrines, I was privileged to spend one full moon-cycle of evenings learning a ritual dance to clear out bad energy and pray for a rich harvest come autumn. As summer began to cool, I called out to customers “いらっしやいませー!(irasshaimase-!)” in the local produce section of the supermarket selling organic mushrooms a farmer friend had grown. As the leaves began to turn color again, I harvested bundles of rice tied with string and slung them over bamboo frames to dry, the traditional way. Outside of Sado's AFN, I also observed how farmers sprayed fields with farm chemicals, cut grass verges unfailingly and burnt farm waste in open cold air, smoke hanging low across the valley in acrid swathes.

I was finding that through my interest in the people, their work and the culture here I was being invited to be a real acting part of the system. Treated not as an observer-outsider looking in, but an opportunity to give time, skills, knowledge. To be a part of the community. Participating in mixed food and culture events, I could see the networks of processors and retailers making time in their already busy schedules to come together, plan and carry out these events, countless times throughout the year. The community, resilience and



flexibility needed to do this so continuously became very apparent. It is a real source of inspiration and hope that such energy could be put toward increasing the environmental sustainability of Sado's AFN."

– field diary reflections of a year's experiences participating in Sado's AFN.

Figure 1 shows Sado's AFN farmer types divided into organic, RCF and NA, highlighting the different sales channels which these farmers use. Some farmers mix both their practices and sales channels, while others only use one type of practice and may only use one sales channel. Interviewees considered selling to online sales platforms which show their farmer profiles as a form of direct sales. Figure 2 shows a schematic of Sado's AFN food processors and retailers who overlap in their use of organic, RCF and NA raw ingredients, which they try to source directly from local farmers. Figure 3 illustrates Sado's AFN, comprising of farmers, food processors and retailers, as well as other key actors connected to these two main groups including JA Sado, Sado city council and educational institutions. The left-hand side illustrates the overlap of organic, NA and RCF (specifically for rice production), for which most farmers use a mix of these three methods. Fewer farmers undertake only one of these practices. It also highlights that there are different groups of

young farmers – both individuals who have informal knowledge sharing groups, and others who belong to formalized groups. A further subgroup of farmers undertake a regionally certified production method of persimmon growing named "okesa persimmon" ("okesagaki" おけさ柿). Although there is less chemical reduction involved than the RCF rice, (due to farmer feedback of pest and disease damage to fruit) farmers are encouraged to try and reduce chemical use, make, and use organic compost. The right-hand side illustrates the food processors and retailers (restaurants and cafes) in Sado's AFN. Many of these interviewees do both retailing and food processing, such as running a restaurant while serving home-made fermented pickled vegetables and jams, shown by the overlap. Farmers and food processors and retailers have strong connections as they sell, buy, and give produce. Some processors also encourage farmers to grow more produce for their processing needs. JA Sado includes several subgroups, including the tokimai brand, RCF, a NA study group for all interested or practicing farmers who are members of JA Sado and a new entrant farming program. Many farmers are members of JA Sado, some to sell their rice to them as well as take advantage of information and events, and others just for the knowledge. Some food processors have connection to JA Sado through the events it organizes for organic and NA farmers, so that they can learn about production and make new farmer connections who may be able to produce more

TABLE 1 Farmer interviewee profiles.

Food producer (farmer) interviewees								
Farmer no.	Age range	I/U turn	Reduced chemicals	Organic	Natural agriculture	JA Sado sales	Direct sales	Other sustainable activities
1	55–60	I-turn	√			√	√	Reduces waste of persimmons by creating added-value products.
2	60–65	U-turn	90%	2%	8%	70%	30%	Creating “organic village”.
3	70–75	Always lived in Sado	√	√		50%	50%	Cultivating abandoned farmland and doing traditional forest management, using own local resource compost.
4	30–35	U-turn		√	√		100%	Traditional rice harvesting without machinery, farming experiences for city people.
5	45–60	I-turn			√		100%	Makes pickled vegetables as a community group.
6	50–55	U-turn	50%	50%		c.90%	c.10%	Invites farm work experiences from Japan and abroad.
7	50–55	I-turn	√		√	√	√	
8	40–45	U-turn	√			30%	70%	Uses compost made themselves with local oyster shells, manure, persimmon waste, rice husks and woodchips.
9	35–40	I-turn		√		30%	70%	
10	45–50	U-turn	√	√	√	90%	10%	
11	45–50	I-turn			√		100%	Works part time in forest management.
12	30–35	I-turn		√		80%	20%	
13	60–65	Always lived in Sado	c.30%	c.10%	c.60%	100%		
14	25–30	U-turn	√		√	100%		
15	55–60	U-turn	30%	70%			100%	
16	30–35	U-turn	√			90%	10%	Establishing a company with friends to attract more young people to Sado and to farm.
17	35–40	U-turn	√	√		99%	1%	Makes compost from local resources and is a part of the company being established to attract new farmers (above).
18	50–55	U-turn	√	√			100%	

TABLE 2 Food processor and retailer interviewee profiles.

Food processor / retailer interviewees								
Processor/ retail no.	Age range	I/U turn	Type of processor/ retailer	Locally sourced	Organic/ NA/RCF ingredients	Direct from farmer	Natural production methods (no chemicals)	Other sustainable activities
1	55–60	U-turn	Beverages	√	√	√	√	Runs workshops on natural sake making process, as well as activities to increase the awareness of Sado's sustainable & local food system, create connectivity on the island and run workshops for people on the island and beyond.
2	35–40	U-turn	Beverages	√	√	√	√	
3	30–35	I-turn	Fermented food	√	√	√	√	Creates a market opportunity for local farmers to increase organic and natural agriculture produce.
4	35–40	I-turn	Beverages	√	√	√	√	Uses abandoned orchards and fields to forage for herbal beverage ingredients. Actively employs less advantaged people.
5	50–55	I-turn	Restaurant	√		√	√	Certified as a food/dietary education instructor.
6	40–45	I-turn	Restaurant	√	√	√	√	Aiming to be more than a restaurant - somewhere that community can be built. Connected to arts events too.
7	50–55	Always lived in Sado	Cafe	√	√	√	√	Uses locally sourced wild plants for making teas, from local tea makers. Also supports local community and culture events.

TABLE 3 Other food network actors' interviewee profiles.

Other food network actor interviewees			
Actor no.	Age range	I/U turn	Position
1	40–45	Always lived in Sado	Sado City Council Agriculture Policy Division
2	40–45	Always lived in Sado	JA Sado Sales Planning Division Farming Public Relations
3	25–30	Always lived in Sado	JA Sado NA study group
4	30–35	I-turn	Agriculture high school teacher
5	40–45	I-turn	Niigata University – Sado island center for ecological sustainability
6	30–35	I-turn	Sado RRCO
7	25–30	I-turn	Sado RRCO

TABLE 4 Workshop participant profiles.

Workshop participants			
Participant no.	Age range	I/U turn	Position
1	40–45	Always lived in Sado	Sado City Council Agriculture Policy Division
2	40–45	Always lived in Sado	JA Sado Sales Planning Division Farming Public Relations
3	40–45	N/A	Sado City Council SDGs Promotion Chief
4	30–35	I-turn	Sado “furusato nôzei” (ふるさと納税) Promotion Manager
5	30–35	I-turn	Sado Regional Revitalization Corps officer
6	25–30	I-turn	Sado Regional Revitalization Corps officer
7	40–45	I-turn	Niigata University – Sado island center for ecological sustainability
8	55–60	U-turn	Natural agriculture farmer
9	55–60	I-turn	Reduced chemical farmer
10	55–60	I-turn	Reduced chemical farmer
11	45–50	I-turn	Natural agriculture farmer
12	70–75	Always lived in Sado	Reduced chemical and organic farmer
13	35–40	I-turn	Reduced chemical and organic farmer
14	40–45	I-turn	Natural agriculture dairy farmer
15	40–45	I-turn	Natural agriculture dairy farmer
16	50–55	Always lived in Sado	Café owner and wild herb beverage processor
17	30–35	I-turn	Organic food processor
18	40–45	Always lived in Sado	Wild herb processor
19	30–35	I-turn	Fermented food processor
20	45–50	I-turn	Forester and gardener
21	30–35	I-turn	Artist with an interest in sustainable food processing
22	35–40	I-turn	Stage actor turned food activist

raw ingredients. Sado city council has a dedicated agricultural policy division which consults on policy from and to regional and national government from the local level and collaborates with JA Sado on programs such as the tokimai brand. It also has sectors which oversee food education certification as well as a regional revitalization corps (RRC) section, which often overlaps with aiding farming issues in each locality. The agriculture policy division and RRC have direct connection to farmers as well as through JA Sado. Food processors and retailers have links to Sado city council through the RRC and food education, but also through subsidies to start-up new or revitalize existing businesses. The prefectural agriculture association

hosts a young farmers club and leads certification on the okesa persimmon certification. It directly connects to farmers through these channels, as well as to JA Sado and Sado city council. Interviewees covered all the groups shown in Figure 3, however it is not necessarily a complete picture of Sado's AFN, as other elements such as forestry and fisheries were not included as part of the research. The right-hand column of Tables 1, 2 (detailing the farmer and food processor and retailer interviewees), gives a brief description of the extra activities which feed into the AFN as undertaken by the interviewees. These activities are referenced in the text below, providing insight into the overview of Sado's AFN.

While 20% of rice paddies in Sado produce under the tokimai brand (Toyoda, 2021), which is a noticeable extent of farmland, it is apparent that the majority of farmland is under conventional production methods. A smaller area is under organic and NA, (for example those farmers interviewed in this study). It became apparent from the interviews (see results below) that farmers (whether rice, vegetables, or fruit) struggle to produce using organic and NA methods in part due to the surrounding conventional farmers complaints which are said to stem from their perception that such methods increase pests and disease, and make the landscape appear “untidy.” It is therefore apparent that sustainable production methods including the tokimai brand, organic and NA are in the minority and acting as the “alternative” food network to the majority conventional production in Sado. RCF production can be seen as a bridge between the mainstream and alternative food network in Sado – being a part of both systems. This bridging position can be seen in the production methods (reducing chemicals is a route toward organic or NA) and in relation to the production area and distribution (while the majority of rice production is done by conventional agriculture, rice distribution by JA Sado includes a large proportion of RCF rice, and so this can be seen as part of the mainstream food system).

In other regions of Japan, such as in Hirakata, Osaka prefecture and Iga, Mie prefecture AFN's use a vegetable box scheme and “teikei” approach (a co-partnership between consumers and producers with direct distribution) using organic principles (Kondo, 2021). Similar systems in the West can be found, for example in the UK the Community Supported Agriculture network acts to assist consumer-producer co-partnership systems, and a variety of box schemes can be found across Europe (Kummer and Milestad, 2020; Bonfert, 2022). In contrast, Sado's AFN does not include teikei/CSA or box schemes but instead consists of a number of individual RCF, organic and NA farmers, selling either through JA Sado or via direct sales channels, mainly to those in mainland cities.

It is evident in speaking with many of the interviewees, alongside participating in events in Sado, that there are several reasons that they chose to live there and work in the island's food network. For many I-turner interviewees, this is a combination of several elements: the receptivity of the existing community on the island of both new-comers and those having lived their whole lives in Sado (the receptivity of the latter can depend upon the community); the natural environment that it offers (a return to nature often from an urban area); the ability to source local, fresh ingredients; the culture, which is rich in traditional arts events supported by local food retailers; and the opportunities available as somewhere which has relatively low population compared to urban areas of Japan. In particular, regarding processor and retailer interviewees, these elements, combined with support for business development in the form of subsidies, create an ideal place to relocate and start-up a business. For many I-turners, previous to deciding to move to Sado their connection to it had been almost non-existent. Food processor interviewee 7 explained that they had traveled throughout Japan to find an ideal place for relocation, and the feeling of community had been strongest in Sado. This was a major (but not the only) factor for them in choosing the island. Conversations with other migrants on the island revealed similar journeys. Barriers that may occur with being an island (especially for exporting and importing to the mainland) are therefore of less importance. Similarly, for U-turners, the opportunities to develop their own farms and food processing businesses alongside existing familial connections creates an ideal situation from which to begin.

Despite this, it is not without its issues, such as lingering conservative attitudes to farming (e.g., “neatness” of fields and beliefs around pest invasion from organic and NA farms) and the need for more capacity in networking and knowledge exchange.

With more people relocating to Sado in recent years, many new entrant farmers and eateries have begun to regenerate several areas. While not all of these are undertaking sustainable practices, there is a focus on producing and serving local food from what is perceived as a rich natural environment. There is therefore scope to increase the sustainability of these new businesses through Sado's existing AFN.

3.1.1 Community and relationships

From conversations and experiences with different communities in Sado, it is apparent that there is much complexity within the AFN. Communities and identities form (new ideas), brink on the edge of extinction (loss of successors), clash or meld together (conflicts or alignments in different farming practices and beliefs). This depends upon the culture, social norms and philosophy of the people. There is a mix of farming and sales practices. Some new migrant farmers may use pre-industrial sustainable agriculture techniques such as NA, while selling their produce mainly outside of the island to large cities such as Tokyo via online channels, as these customers have a greater awareness of sustainable production methods and can afford to pay a higher price (which is profitable compared to local sales despite transportation costs). Other farmers reject pre-industrial techniques due to the perceived need to grow “high quality” produce (no blemishes, regular shapes etc.) and greater quantities, while selling mainly to local markets in Sado. Some try to reduce farm chemical use and sell through a variety of channels. Some food retailers, such as restaurants and cafes try to use local produce, although it may not have been produced in an environmentally friendly way. Others seek to source ingredients that are sustainably produced but have to be shipped to the island, while trying to collaborate with local farmers to produce more organic and NA raw ingredients.

There is a strong bond of friendship and comradeship within a group known locally as the “seven samurai” farmers, including farmer interviewees 1, 13 and 18, who practice a mix of organic, NA and RCF. They regularly contact each other to consult on their progress of farming, weather, pest, disease and other issues throughout the year. This was apparent in interviews as well as through attending both formal farming meetings and informal gatherings. Organic farmers surrounding this inner group also like to connect and share information with other organic farmers both on and outside the island. They are self-motivated to learn individually and together. In contrast, those that farm solely with NA methods – such as interviewees 5, 11 and 15 – explained in the interviews that they preferred to find their own individual methods, through taking inspiration and learning from reputed NA masters and then observing the results of their own actions on the farm. They often spoke of a strong philosophy behind their practices, and indeed their lifestyles, in trying to make a minimum negative impact upon the environment.

Interviews with food processors, restaurants and cafes highlighted that they are relatively well connected to local farmers. Food processor interviewee 3 who produces fermented soybeans tries to source all their soybeans locally and organically, however the demand is greater than the supply. In this case they have created connections with organic and NA farmers on the island who they do not already buy from and are negotiating quantities and prices for their use in processing. This requires close local connection and a bond of trust,

through knowing the farmers already or being introduced by a trusted intermediary. Such connections are vital in order to make local food processing an economically viable and environmentally sustainable business. Food retailer interviewee 7 is attempting to grow vegetables for use at their restaurant with the help of local friends and acquaintances, while also creating close neighborhood connections and informally receiving fruit, vegetables, meat and wild mountain forage for restaurant use. The interviewee related that such connections and the local food served give the restaurant more value to its customers.

Food processor interviewees 1 and 7 specifically related the importance of community in their work – creating a place for connections between local and visiting people to happen organically and events to be held, rather than being focused on creating profit as a business. Food processor interviewee 1 runs a sake company, from which the profits, as well as waste products, enable them to run a café which aims to create human connections as well as people to food connections, through using local ingredients. Food processor interviewees 1, 7 and 8 also related the importance of using their café spaces as places to hold workshops for the community to pass on important knowledge about plants that grow locally and their uses. Food processor interviewee 4 and farmer interviewee 1 stressed the importance of employing disadvantaged local people, providing them with environments that are not stressful but are instead flexible. These aspects of community care strengthen both local relationships and connection to nature on the island. They are a way to create new connections, strengthen existing ones, foster trust and understanding toward other humans and other living beings.

3.1.2 Local food and community events

A remarkable point about food networks in Sado is the number of events that are run throughout the year, mostly from spring through until winter. At the busiest times of year such as summer, events can be run on every weekend. These events vary in their contents; however, a common purpose is to bring together the community. Many of these events are restaurants, cafes and processors coming together to collaborate under a theme, while others are in combination with local traditional and/or modern arts and culture. While there is an appeal toward tourists, many of the events cater toward the local community, maintaining and strengthening the connection between the food retailers and processors. Some themes of the food events that I have experienced while living on the island have been around conscious food choices (two vegan events), otherwise they are mostly to promote local produce and new food processors (local fermented foods, locally made baked goods, special collaborations between different food processors or retailers etc.) The promotion of local food often occurs in combination with cultural events, which through personal observation and conversations with local people is evidently an important aspect of the island's identity. It is also a source of enjoyment for the food processors and retailers who are part of these events.

3.1.3 Fun, food and farming

Farmer, food processor and actor interviewees expressed the importance of fun and enjoyment that they held and needed to undertake their work. This sense of fun has similarities and differences across the interviewees and is likely to be connected to their individual contexts and goals, which may also change over time. They can be categorized as: a sense of accomplishment/realizing a goal of

working how they want to; aligning with their values (e.g., living in harmony with nature, creating positive opportunities for others); having fun in compensation for low wages; being in and creating community; being motivated toward a personal goal and that which has wider resonance for nature and community.

If the image of farming is only of hard work and low returns Japan and Sado's farming network is likely to keep declining. For farmer interviewee 4, fun in farming is partly being able to share doing it with friends, while expanding their friendship and the farm's capacity by running farm experience and traditional culture dance and music events which bring city-dwellers to Sado. They are also in the process of setting up a guesthouse for both transient and more permanent farm helpers. Through this, some of the city dwellers have moved to Sado to help on a more regular basis while simultaneously having other jobs. For interviewee 4, this shared farming model lessens the labor of farming, creating capacity and therefore enabling them to do more natural farming methods to feel a sense of being in harmony with/working alongside nature. Further, the sense of achievement they feel in providing an opportunity for people to experience being in nature and producing healthy food for customers is source of fun. These young entrants to sustainable food production want to be able to live in co-existence with nature without the traditional hardship image of previous generations.

Farmer interviewee 2 and 18 had a sense that although life is hard as a farmer as they work long hours and do not receive a wage that corresponds to this, there is a sense of fun gained from working through the challenges of farming and the achievement of producing food that customers enjoy. Fun for these farmers is also created in sharing practices and challenges with their close farmer friends, as being able to do this as a group creates a sense of community and motivation.

For farmer interviewees 11 and 12 who mainly work independently, their sense of fun comes from the accomplishment of creating healthy produce through their own sustainable means. For interviewee 11, this is through having a permaculture mindset and creating a system within the landscape, even if small, where everything is connected and resource cycles flow. While they are working on achieving this, the potential of realizing it is motivational which also brings a sense of enjoyment; however, they would like to be better connected to other actors which would provide a sense of community and therefore more enjoyment.

For processor interviewees 3, 4, and 8 the sense of fun comes from having realized a life goal of setting up independent businesses where they can source sustainable ingredients such as organically produced soybeans and wild herbs, sell healthy produce and therefore contribute to a more sustainable society. Processor interviewee 4 further employs disadvantaged people, which gives them a sense supporting local community and enjoyment through this.

Actor interviewee 6 and 7 related that their sense of fun comes from working on projects that lead to positive opportunities for others in the food network, while undertaking work that they enjoy (actor interviewee 7 has been able to employ their illustration skills in creating advertisements about the local direct food sales shop).

3.2 Farming support needs

Table 1 describing the farmer interviewees shows a mix of age ranges, between 35 to 75. Most interviewees were between 40 and 45

and had either made an “I-turn” or “U-turn” (for U-turners, the minimum amount of time out of Sado was 2 years). This shows a trend in younger people making a move to a rural location (I-turners had moved from urban areas). Initially for farmer interviewees 1, 5 and 7, this move was not specifically to undertake farming but to be closer to nature. Through finding work once in Sado, farming became a viable option and then a passion. [Table 1](#) shows that there is a mix of sustainable farming practices in Sado, including RCF, organic and NA. There are also two main sales channels, one through Japan’s biggest agricultural cooperative JA (JA Sado branch) and the other through direct sales. Most farmers use a mix of farming methods as well as sales channels, although there are some that only adhere to one farming practice and or sales channel. This highlights the “messiness” of farming in Sado’s AFN; there are farmers who mix their practices and farmers who focus only on one production method, e.g., NA.

Throughout the interviews with farmers, food processors and representatives of JA Sado and Sado city council agricultural policy division, there were some consistent common challenges that arose. These included an aging and decreasing rural population, especially regarding successor and new entrant farmers, an ensuing abandonment of farmland and houses, several barriers to farmers converting to organic or NA methods and a decrease in consumption of the main crop (rice) in favor of newer foods such as bread. These challenges are not particularly unique to Sado but can be found across Japan ([McGreevy et al., 2021](#)).

3.2.1 Network, knowledge exchange, and capacity

Despite aging and decreasing numbers of farmers, both JA Sado and Sado city council offer opportunities for successor farmers and new entrants to access farming on the island. JA Sado offers a “New Entrant Farming Programme” (就農研修制度 – “shūnō kenshū seido”) which gives farmers training with expert farmers on the island over three years, provides them with employment in JA Sado, community housing and potential financial aid with rental payments, as well as support for those migrating to the island. JA Sado then gives three years of follow-up advice support for those who have undertaken the program. Farmer interviewees were also appreciative of the capacity that JA Sado and Sado city council provide in terms of organizing farming events where farmers can come together to learn and exchange information. Further, Sado’s population of young farmers are also able to connect through the “4H Club”, a nationwide initiative organized by each prefecture to sharing learning, knowledge and issues. More broadly, for migrants to the island, Sado city council offers reduced price accommodation for up to six months in which more permanent accommodation and work can be found. However, despite these efforts, new entrant farmers are still regarded as too few by the interviewees. Many of the interviewees thought that this was due to a lingering negative image of farming as being hard work, receiving low wages and living in the countryside as having obligations to the local neighborhood (集落 – “shūraku”) as well as a general lack of entertainment compared to city life.

New and successor farmers are either given land for free, for a low price or inherit their parents’ land. Often this land is very small, and some young farmer interviewees related that it can be an issue for making enough money to live from. In previous generations in Japan, there was a culture of farming for the family and selling whatever is extra, creating a culture in which other work (sometimes several jobs)

are also needed. Many of the young farmers interviewed were being asked to take over more land from those retiring or giving up farming. While this means that they can grow their businesses, often this land is in small parcels far from their existing land and so can make it difficult to manage. Social relations can also be a key issue in acquiring new or more land, as farmers want to know who they are passing land on to so that there is a bond of trust and assurance that the new farmer will not cause offense to those in the local neighborhood. This can mean having to stick to rigid social norms around farming that the previous generation has pertained to, such as cutting grass verges around paddy fields at regular intervals, as well as applying farm chemicals. Even on grass verges organic and NA farmers face pressure to apply chemicals and cut the grass very short (as close to the soil surface as possible, usually less than 5 cm above the surface). These practices are seen as keeping the neighborhood clean and tidy and part of the responsibility of being a local inhabitant. For many new farmers who want to practice organic and NA this can create a problem. Organic and NA farmer interviewees said that to escape this problem, they often acquired land away from others, in the mountainside. They pointed out that this is inherently more difficult to farm in terms of access than land below the mountains, as found in other studies of Japan’s rural areas ([McGreevy et al., 2021](#)).

Organic farmers, especially the “7 samurai”, are championing organic farming in more open, flat lands within the main farming basin of Sado, however. They have formed a NA research group organized by JA Sado as well as an initiative to supply local nursery schools with organic lunches. These farmers had a history of championing the tokimai brand to reduce farm chemicals and increase biodiversity, and so they are well known on the island as farming pioneers. Despite this, many farmers are still finding it difficult to convert to organic and NA practices. Farmer interviewees, JA Sado and informal conversations with non-organic farmers at local farming events say that this is due to the great variety of pests in Japan and the coping with a reduced harvest during the first few years of conversion. Interviewee 2 expressed that conversion compensation for yield losses was not enough. This is compounded by social pressure of surrounding conventional farmers. Interviewee 2, one of the “7 samurai” farmers, acknowledges the importance of this like-minded friendship group in providing support to each other and swapping farming experiences to continue with organic and NA practices, especially under the pressure of opposing social norms.

Farmer interviewee 2 related that they had a good relationship to the current mayor of Sado, based on the mayor’s interest in furthering organic and NA and Sustainable Development Goals (SDGs) in Sado. They expressed that they thought it was important for the mayor to have this outlook, in contrast to JA Sado, (who they think has a greater focus on farming production and profit) as the latter are more biased by the need to make a profit. Other farmers, such as interviewee 1 stated that despite the mayor’s focus on the environment, the city council needs to think more about the long-term future of farming in Sado and provide more financial aid, especially for young families.

JA Sado provides support to farmers who are members, including organizing knowledge exchange events and seasonal information on the farming schedule. Only two of the interviewees are not members of JA Sado (interviewees 5 and 11 who are NA farmers), citing that the costs of being a member are too expensive and they prefer to source their information independently. Interviewee 2 related that they find knowledge exchange events very important for having time to learn

and talk with other farmers, and they recognize the importance of the capacity needed to organize such events. Having a body with the capacity to continue supporting the organization of such events was seen as necessary and important for the continuation of sustainable and alternative farming practices in Sado. JA Sado's main focus is on conventional agriculture, and so being a member with a focus on organic and NA, farmer interviewee 4 also found that a lot of the information they pay for as a member is not necessarily applicable. As a new entrant, they further expressed a need for a basic information handbook on how to begin NA farming, as most of the information in the NA study group was too advanced and exchanges with other farmers proved confusing due to the variety of individual methods employed. Other farmer interviewees, such as interviewee 10 and 18, expressed a need for more events developing knowledge for growing vegetables, which they felt unfamiliar with but want to grow more of, especially where organic school lunches are concerned.

Another key issue expressed by many farmer interviewees (1, 2, 3, 6, 8, 9, 11, 15 and 18) was the ability to get labor. Interviewees 1 and 6 stated that they thought it was particularly difficult to get skilled labor. The seasonal nature of a lot of the farming work is also problematic, and interviewee 1 suggested that working through non-farming season in tourism, with help from the city council for training and work opportunities would help with this issue. Farmer interviewee 6 and 11 have been able to connect to labor resources through interviewee 15, as well as other local resources such as hiring companies (farmer interviewee 1 noted that these come at a price which can be difficult to pay) and international voluntary services such as "World Wide Opportunities on Organic Farms" (WOOF). However, skilled labor is not guaranteed. Interviewee 6 also makes the most of local connections through a hostel in which they can host labor from the WOOF program, and to which they sell their rice. Further, farmer interviewee 16 is making connections through agricultural universities to advertise working holidays in farming for students.

One group of young farmers (led by interviewee 4) uses an innovative approach to decrease the pressure of farm labor and increase the fun in farming. Interviewee 4 is a farmer descendent, and working alongside acquaintances and friends from the island they have expanded their workforce through a model in which the workers help in the areas of farming that they want to and do other work that they want to the rest of the time. Through selling directly in city markets and using SNS they have been able to recruit interested individuals. Most of these workers also run their own small businesses / cottage industries or work for other local businesses, which was expressed as "plus alpha." The young lead farmer here advocates that this model allows everyone to enjoy farming, while not having to rely on it as a sole income. They are also able to share their own farm workload while not needing to pay all the workers full-time wages, which they would not be able to afford.

3.2.2 Funding and finance

In terms of funding for organic and NA, farmer interviewee 2 expressed that although they were able to receive funding to compensate for reduced yields during the three-year conversion period from conventional farming, it was not enough when compared to what farmers in the EU can receive. Despite this, with the new green farming plan, they have hope that the government will change its policy to provide more financial support for conversion to more environmentally friendly farming. In addition to this, farmer interviewees 1, 2, 4, 6, 8, and 17 related that they think the current

financial aid given to farmers in the form of basic subsidies is not enough – for example it does not help to cover the costs of machinery repairs, which can be very costly. Farmer interviewee 2 estimated that farmers only receive 60–70% of what they actually need, and after receiving subsidies once it is normal for them to be refused a second time. Farmer interviewee 4 also mentioned that more focus should be put on creating a local circular economy, where more money from locals is spent on local produce. Farmer interviewee 1 noted that although JA Sado can provide assistance with subsidies, as a business their need to make a profit means that equipment and organic fertilizer is often actually more expensive than that sold at home centers and other outlets. Actor interviewee 1 agrees that funding is inadequate and often farmers have to have another job.

3.2.3 Customers, sales, and marketing

Many of the farmers interviewed sell at least some, if not all, of their produce on the mainland through direct sales (see Table 1). They related that this is due to there being little awareness or knowledge around organic and NA in Sado, and that local people would not be able to buy at the prices that they sell. They would like more support from local consumers. In particular, interviewees 2 and 4 spend a lot of time advertising the benefits of their production methods through social media, television and attending consumer-facing events. Some farmers, such as interviewees 4, 5, 11, 15 and 18 do not certify their produce as organic due to the high costs and instead prefer to interact with customers more personally so that a level of trust is built on which certification is not needed. Despite a low awareness of organic and NA farming, anecdotal evidence from living in Sado has provided evidence that there is an appetite for local produce. The JA Sado cooperative stores, direct-sales shops and other chain store retailers sell local produce including rice, vegetables, fruits, and locally processed foods, albeit not labeled or certified as organic or NA, but with the farmer's name. This produce can sell out fast, especially when stock is low, and so there is an evident desire for people to buy locally and likely from farmers they know personally.

Farmer interviewee 1 expressed the desire for JA Sado to do more marketing, promotion and sales of the produce, so that farmers have more capacity to focus on the quality of their farming. Farmer interviewee 12, actor interviewee 1 and 5 expressed that it is expensive to sell through JA Sado as they have less negotiating experience against retailers and so would prefer to be able to sell more of their produce directly or through another channel. Similarly, interviewee 11 has found sales difficult and would benefit from someone who is able to create connections to retailers and consumers so that they can focus on farming. Interviewees 3 and 14 talked about the need to gain more training and opportunities to understand customer demand. Some interviewees (2, 4, 6, 8, 18) use their skills – whether experienced or limited – to advertise their produce through social media, having found that this is both a good opportunity and that other avenues of support, such as JA Sado, are limited.

3.3 Food processor and retailer support needs

Table 2 describing food processor and retailer interviewees shows that the interviews are relatively young (mostly in their 30s and 40s) and have moved to Sado as I-turners. All processor and retailer interviewees sourced at least some of their ingredients locally, directly

from the producer and from farmers using organic, natural agriculture or reduced chemical farming methods. All processor and retailer interviewees also used natural methods in their processing methods, (at least to some extent, if not for all their products, e.g., one restaurant owner serves some pre-processed food with chemical additives).

3.3.1 Network, knowledge exchange, and capacity

For processor and retailer interviewees, farmers, other local businesses and food system actors have been vital in obtaining resources such as raw produce, sharing knowledge and in having a community. Processor interviewee 7 expressed the importance of personal relationships and compatibility in deciding where to set up a life and business, as well as in making good community for alternative food networks. They have found a deepening of relationship with repeat customers and have made connections to farmers for meat and vegetables both nationally and locally from such connections. Processor interviewee 1 expressed the need for more capacity from local government to create stronger networks across the island and beyond. This interviewee recently opened a café as part of their drink processing business, for it to be a space in which local and visiting people can meet, exchange ideas and network. They also organize annual events such as seminars, workshops and tasting experiences to bring together knowledge from outside and within the island to expand people's thinking, ideas and perspectives. They are also looking to expand into other ventures and need to be able to connect with people and businesses who have specialist knowledge. Despite their efforts in creating local, national, and international networks, processor interviewee 1 still feels a need for greater networking from an institution which has more capacity. Anecdotally, this is a position which the local council is considering developing, and which would benefit local businesses if done well through acknowledgement and understanding of current networks which can be built upon.

Processor interviewees 2 and 3 share a concern in trying to find more NA farmers to supply environmentally friendly grown crops to expand production. Currently, the former uses 15% NA raw materials, with the rest locally produced but not through organic or NA. The latter is proactive in connecting to and negotiating with local farmers directly, as well as with JA Sado to attend farmers meetings a present about their produce needs and business aims.

3.3.2 Funding and finance

Most interviewees who had set up new retail businesses said they were satisfied with the level of support received from Sado city council, which included grants to help refurbish buildings for use as restaurants, cafes and for small cottage industry processing of food. Without the grant funding on offer, many said it would have been difficult to establish new businesses. Interviewee 4 commented that it was important to be able to receive funding for different aspects of the business, which they had been able to do, and for the funding to be flexible. Others, such as interviewee 3 and 8, thought that it may be difficult to get the subsidies again or presently, as the amounts available have reduced. This may cause a serious bottle neck for other local businesses starting-up.

3.3.3 Customers, sales, and marketing

In terms of business development, sales and advertisement, interviewees were happy to find connections themselves, e.g., through

the use of the internet or friends and acquaintances, for example in learning how to process food, finding a designer for creating branding and doing marketing themselves through social media. Therefore, there was little perceived need for institutional aid regarding this side of business development, which contrasts to farmers who expressed a need for help with sales and marketing. However, processor interviewee 4 expressed the need, similarly to farmer interviewee 16, to be able to understand customer preferences better, improve customer relationships and develop their markets. Interviewees often use events as an opportunity to do this, but some would like to have a more rigorous approach such as undertaking surveys, however they need more skills and capacity to do this.

3.4 Other food network actors' perspectives

Table 3 describes the other food network actors interviewed in Sado. These actors come from a mix of institutions including Sado city council, JA Sado and education. These institutions have inherent links to the food network as well as having important personal relationships to farmers and food processors and retailers in Sado. From observation, much of the work they do is in direct partnership with farmers and others working in landscape management, and they can give capacity for knowledge exchange events, future visioning and practical work in the field. Half of these actors have always lived on the island, and the other half are I-turners, all of them are relatively young (between 25 and 45).

3.4.1 Network, knowledge, exchange, and capacity

Actor interviewee 1 of Sado city council agricultural policy division, actor interviewees 2 and 3 of JA Sado and the JA Sado NA study group related that they work together to help farmers with subsidy applications and payments, co-creating and distributing information, branding and media broadcasts. They also translate policy and feed innovative environmental farming practices from Sado to national policy makers (in recent years there has been particular interest in the tokimai brand to support the government's new Green Food System Strategy – みどりの食料システム戦略 “midori no shokuryō shisutemu senryaku”). It is therefore evident that Sado city council plays an important role in Sado's food network in working with farmers and JA Sado.

To make use of abandoned fields, JA Sado has come up with an initiative to grow flowers in these areas. Actor interviewee 1, along with other farmer interviewees, find it difficult to adapt to this as they do not have the experience. This highlights a mismatch in understanding and friction between JA Sado and farmers, who have expressed frustration at being requested to undertake this work.

Actor interviewees 6 and 7 work for the city council as RRCO's and have a focus on landscape management and added-value local food processing, respectively. They have been particularly involved with helping farmers manage areas of abandoned rice fields for increasing biodiversity and the crested ibis and revitalizing traditional food processing methods. They are both I-turners and want to encourage other people to relocate to Sado, although they think there is still an all-pervasive message for young people to go to cities for more convenience, a better lifestyle and more job opportunities. Their

role as an RRCO has allowed them to explore Sado's rural challenges and opportunities as well as making a large network from people of different sectors. From this, they have tried proposing various solutions, but have felt that there is a generation gap in mindset and societal norms, such as less experienced staff not being perceived as wise enough to make suggestions that could be realized in the workplace and real world. Actor interviewee 7 also found that communication between local actors was unclear leading to mismatched expectations, friction and project failure. Actor interviewee 6 would like to create more job opportunities and a circular economy in Sado and are thinking of ways to create an online, ongoing database of resources currently available in Sado (e.g., vacant houses) and historical assets (e.g., what vacant shops used to be, who they were connected to, why they stopped being viable etc). They think that this could help people in the initial stages of relocating to Sado to be more equipped to start a way of life in this rural area. Through their networks to the local university and their research connected with a national big data venture, they are scoping ways to realize this project.

3.4.2 Customers, sales, and marketing

Actor interviewee 4 expressed that they think the general consumer awareness of environmentally friendly farming and wider sustainability issues are low in Japan in comparison to other areas of the world such as America and Europe. This creates a lack of support and a smaller market for such farming practices. They also thought that part of the reason for this was that the Japanese government still focuses on productivity in farming, rather than environmental sustainability.

3.4.3 Facilities

In terms of food processing, actor interviewee 5 related that Sado has very few processing facilities, which may be due to people's preferences to eat fresh. They think that this would help to decrease food waste, and that the council is looking for investors to help create such facilities. However, there are several informal neighborhood and friendship groups also continue to produce traditional pickled vegetables together or individually at home. For such groups, this practice creates a strong sense of community and identity through collective sustainable action. More facilities could help create increased opportunities for such sustainable activities and grow the AFN.

3.4.4 Future farmers

Actor interviewee 5 works with various communities in Sado related to both education and primary industries. They have learnt through this work that farming still has an undesirable image as a career path, which can stem from capitalist values. This interviewee expressed that they think there is a need to change values and increase awareness about the importance of environmentally friendly farming. They noted that it is important for farmers to be willing to change and that many of the older generations do not have the motivation to change their practices. Actor interviewee 1 related that at a farming meeting in Tokyo during 2022, due to the efforts for reducing farm chemicals in Sado and the specific tokimai brand, it was suggested that farmers who have a "unique" or environmentally focused attitude to farming should go to Sado to learn or farm there. This suggests that Sado is renowned nation-wide as pioneering in more environmentally friendly farming and can be a positive place for farmers wanting to

learn such practices. These two opposing but co-occurring situations show the complexity of the farming community, but also that there is hope through the pioneering farmers in Sado in guiding the way for younger entrants.

Regarding generational knowledge, actor interviewee 1 thought that JA Sado's new entrant farming program was good for passing older generations' intuitional knowledge to younger generations, but that there needed to be more farming mentors. JA Sado teaches farming in schools, while actor interviewee 4 related that schools teach children to grow vegetables, sell these to a local café and create recipes with them.

Part of the marketing for the tokimai brand is a JA Sado project to involve the public in rice farming by annually planting and harvesting a field of rice designed into a picture created through a competition by school children. The interviewee related that JA Sado also teach about farming and food in local schools to motivate younger generations to farm. They felt from experience that older generation farmers do not have as much motivation as younger generations, which is an issue in switching to more environmentally friendly practices.

3.5 Sado AFN workshop results

The workshop held with 22 participants verified the contents of the interviews, while giving ideas for the next steps to progress and develop Sado's AFN.

3.5.1 Appealing to local consumers

In the workshop, participants were invited to think from the perspective of local consumers to brainstorm how they might be attracted to buy more sustainably produced food. There was a strong opinion that local consumers want to buy food that is consumed daily at a low price, competing with that imported from other areas. Further, they felt that local consumers' awareness of sustainable food is low, as previously related by farmer and food processor interviewees. Several ways of increasing awareness were suggested – making more sustainable food workshops available in Sado, focusing on advertising the health benefits of sustainable food so that it is directly related to the individual, better understanding what consumers want, and displaying easy to understand information about how the produce has been grown at the place of sale. Other ideas included creating a brand for Sado that expresses sustainably grown food for enhancing the environment (including produce other than rice, for which the tokimai brand already exists). Some farmer participants highlighted the difficulties of working as individuals and suggested coming together as a collective to help each other appeal to consumers, with the help of someone who has skills in marketing and finding buyers. Another idea was to create a community supported agriculture model, where local consumers commit to pay for a year of produce despite the amount harvested or creating a local economy system.

3.5.2 Strengthening the network

This theme developed from interviewees' requests for further capacity in the network, to connect people and create more sales channels. A main request from participants was to have a network coordinator, preferably someone with a bird's eye view of the AFN to create useful connections. Additionally, an online site where network information can be stored was voiced as important. From this

participant's experience, relying on one person as a coordinator creates vulnerability in the case that they leave the position, and the network knowledge is lost. There was a need expressed for more I and U-turners in Sado, who participants think are more open-minded and therefore can create more progression in the AFN. Through connections in the network, the ability to easily move between different seasonal jobs throughout the year was voiced as important for attracting labor and creating stable incomes. There was also a request for Sado city council to better understand the issues of the AFN in Sado and help in creating solutions.

3.5.3 The image of farming

This theme developed from the interviewees' identifying that farming successors are very few and further declining, as young people leave the island to go to university and or find jobs on the mainland, often not returning. In the workshop, as in the interviews, the need for an image of farming as fun arose. Participants related that the meaning of fun for them, either as farmers or in doing farming experiences, was in the feel of moving your body daily in nature and having a good body condition from this work, being able to feel the soil, eating food that you produced together with friends, being able to realize your dream and do your own trial-and-error experiments, doing a job that allows you to really feel and having enjoyable work fully integrated into your lifestyle. Participants felt that a positive farming image could be advertised through these points. They further related a will to create a model example in Sado's of a sustainable food system for other areas to imitate.

4 Discussion

The collective results of experiencing Sado's AFN over one year and the interviews with different actors within the network have highlighted several areas that the AFN could be better supported. They also illustrate how actors in other areas of Japan as well as internationally could provide support to AFNs. These will be discussed below in relation to other literature.

4.1 Fun and farming image

With the continuing decline of farming successors, as well as new farming entrants wanting to have a fun and meaningful career, it is apparent that farming needs to refresh its image. Interviewees, workshop participants and informal conversations highlighted that there is a persistent negative image of farming: too much hard work for too little reward, regarding both finances and fun. An image-makeover for Japan's fishing industry is currently underway, supported by online businesses such as Yahoo,⁴ which could be a pathway for agriculture. While the government provides career pathways to encourage movement to rural areas, such as the RRC, there could be potential in running a more focused sustainable farming initiative, which promotes an enjoyable lifestyle alongside farming. This should include support such as readily available channels to sell produce through, independent of the JA Sado.

Better highlighting examples of rural work where those who are living out and creating fun experiences and lifestyles, such as farmer 4 and the two RRCOs, could help to encourage others to undertake sustainable farming and food processing as a career. Networks across Japan such as the Ministry of Agriculture, Forestry and Fisheries (MAFF) project 農業女子 “nōgyō jyoshi” (farming girl) attempt to advertise new entrants and young farmers as having enjoyable and “cool” lifestyles, as well as encourage women into agriculture. Creating stronger links to such networks as well as emphasizing the importance of sustainable practices could help strengthen Sado's AFN. Relating such stories in schools as potential career paths could further help build the future of the AFN, as advocated for by actor interviewee 5. It is notable and interesting that the notion of having “fun” is a key motivator for young farmers and rural migrants, as was expressed by farmer interviewees 2, 4, 11, 12 and food processors 3, 4 and 8. In other countries such as the UK, other parts of Europe and America, obtaining land and food sovereignty is a main driver and political mechanism to gain support for young new entrant farmers, with the personal joy of farming secondary to this (La Via Campesina, 2022; Styles et al., 2022; Landworkers' Alliance, 2023a,b). Celebrating food sovereignty over trade deals and technology-focused policies would cast the net wider to attract those looking for meaningful work across a range of issues, such as actor interviewees 6 and 7 (La Via Campesina, 2023; Landworkers' Alliance, 2023a,b). However, the Japanese government is currently focusing more on technology and trade policies, despite its new Green Farming Policy (Hisano et al., 2018).

Alongside image aimed at new entrants, building an awareness of sustainably produced food to consumers in Japan is also of vital importance. Many farmer interviewees expressed the lack of awareness or care of the Japanese public concerning the environmental and health benefits of organic, NA and RCF farming. A survey on Japanese consumer awareness in 2021 revealed that more than 38 percent of respondents did not know the meaning of the government's “JAS” organic food label (Statista, 2023). This leads to a lack of market for such products. McGreevy et al. (2021) found that agroecological farmers closer to large urban areas tended to have more success selling their produce, therefore being situated on a largely rural island may cause extra difficulties. Alongside developing awareness, having the capacity to find retailers for products was often cited by interviewees as necessary. Food processor interviewees related the need for a greater amount of sustainably, locally produced raw materials. Their work in proactively creating direct farmer contacts who can grow the produce they need in Sado is resulting in strengthening and progressing the AFN for both farmers and processors.

4.2 Capacity within the AFN

In both the interviews and the workshop, greater capacity was cited as being needed to find buyers for farming produce, skilled labor, and a “connector” role across the AFN. Further, more basic information on beginning NA and organic practices for new entrants was called for. Highlighting innovative young farmers' models, such as farmer interviewee 4's “plus alpha” model, while providing connections between new entrants could enable farmers to have more capacity and a greater sense of enjoyment and lifestyle flexibility. Farmer interviewees 2, 4, 6, and 11 all commented that they would like extra capacity and financial resources for undertaking more specific soil tests, with which they could better understand the status of their

⁴ <https://fishermanjapan.com/about/>

soil – for example the communities of soil microorganisms. Farmer interviewee 11 also expressed the need for building the soil through compost and that a local community compost initiative would be beneficial, although they do not have the time to start this kind of project. Actor interviewee 6 expressed that they thought knowledge about the ability to live comfortably in rural areas could be made more available, for example, average rural wages depending on work, availability of housing etc. There was a further need for increased capacity in creating more local, regional, national and international networks to share information and knowledge. The need for greater capacity has been well cited in other countries regarding socio-ecological production landscapes and their management (Phuong et al., 2017; Urquhart et al., 2019; Black et al., 2021). Lack of capacity and resources has often been found to be a lock-in factor constraining the viability of sustainable farming (Plumecocq et al., 2018; Black et al., 2022).

Maharjan et al. (2021), McGreevy et al. (2021), and Zollet et al. (2021) showed that in Japan, existing “agroecological farmer lighthouses” and “communities (of practice) within the community” create capacity and support for new entrants, through sharing knowledge and developing practices together. In the case of farmer interviewees 1, 5 and 7, farming was a natural progression after relocating and subsequently searching for work. Alongside an image make-over of sustainable farming, urban to rural migration could be more proactively advanced through better advertising existing sustainable communities and new entrant farming programs. Workshop participants’ aspiration to create a model example of a sustainable food system in Sado could be part of progressing rural migration and an increase in new entrant farmers.

Food processor 1 has already set a good example of how others could create networks through organizing events and processing experiences, however they felt that more support was needed. As noted above it is apparent that Sado city council is aware of this need and is looking at developing a role. Indeed, institutional actors have been found to be key in aiding AFNs to progress (Barbera and Dagnes, 2016). Similarly, the RRCOs can provide capacity to local communities through their flexible roles, although as actor interviewee 6 related, it can be difficult to realize positive change within the role itself. They communicated that other RRCOs in Sado have started developing local enterprises such as eateries, which shows that the position does lead to longer-term living and work as active parts of the community. It could be that RRCOs are encouraged to help develop markets and awareness around sustainable farming produce as well. Other countries could benefit from introducing similar RRCO roles, with the flexibility to learn about a range of issues within a rural community and therefore create future rural work possibilities.

Food processor and retailer interviewees commented that support from Sado city council subsidies had been vital in helping set up their businesses, therefore this will be an important aspect to retain to encourage more new entrants into the food system.

4.3 Synchronicity between food, community, and culture

It was evident that food processors and eateries made space for community, both in their restaurants and cafes, and as employers. They place the wellbeing and needs of their employees first, choosing to be actively inclusive to those who need more flexibility and

sensitivity, for example. Choosing local produce also helps strengthen local community.

From personal immersion over the course of a year, it is evident that the traditional culture that remains in Sado has a relatively lively population of people committed to retaining it. This culture (in the form of various ceremonial dances and live music) is often paired with local food stalls at events, and as a key part of community cohesion offers a strong appeal for migrants. Such cultural traditions also have strong ties to the surrounding natural environment and shrines where the year’s harvest is prayed for. Both the I and U-turner interviewees expressed that community culture events were a reason that they wanted to relocate to Sado. In other areas of Japan, modern international arts festivals have gained recognition as revitalizing rural areas and bringing in migrants from urban areas (Klien, 2010; Qu and Cheer, 2020). However, effects on local residents are not always positive, and locally produced art within and for the community often has a deeper and greater positive impact (Leung and Thorsen, 2022; Qu and Zollet, 2023). Sado’s home-grown food and culture festivals are a good example of this. Evident from both interviews and lived experience, new food businesses and farming produce actively input to cultural festivals, building the food, community, and cultural capital in Sado.

Farmer interviewee 15 spoke of their passion to create capacity and resources for the upkeep and renovation of local cultural assets, such as the many underfunded shrines in Sado island. The hometown tax initiative “furusato nōzei” (ふるさと納税) is one channel to gaining funding for realizing such projects, and while donations are purportedly gaining popularity (Hashimoto and Suzuki, 2016), it remains to be seen whether projects can gain sufficient funding.

Indeed, ensuring that existing events are well resourced, and that new cultural projects such as protecting links between people and nature, such as shrines, is likely to be important for the sustainability of rural communities. Strengthening human connection to nature/ other living beings is known to be key for wellbeing while also creating empathy for nature (Faith et al., 2010; Díaz et al., 2015; Riechers et al., 2019). Culture and art are well recognized as a bridge for connecting people to nature (Muhr and García-Llorente, 2020; Black et al., 2023).

5 Limitations and future research steps

This research did not include interviews with those in the forestry or fisheries industries, which are also key parts of the food system and landscape management. As a forested island, it will be important in future research to explore the challenges and opportunities that these sectors face in being sustainable. Further, the study did not interview local consumers in the food system, and so better understanding their perspectives will be a next step to progress both research and the potential to strengthen Sado’s AFN. As this study was a qualitative study, it is subjective and therefore has relatively high level of bias based upon the researcher’s interpretation. While a relatively lengthy time span was given per interview (up to 2 h) in order to delve deeply into the issues and be able to question uncertainties arising from the interviewees’ responses, differences in perspective and understanding are inevitable. As a next step, it would therefore strengthen the research to quantitatively assess producer, processor, retailer and consumer types and support needs. This could feed into a typology in which the diversity of food network actors is set out and from which targeted policies and incentives are created to help aid and increase

sustainable food network actors and activities. This study was a snapshot in time, and with a changing policy environment such as the new green food policy, and climate change effects, it will be important for future research to assess how such changes affect alternative food networks in Sado and Japan more widely.

6 Conclusion

It is apparent that Sado's AFN is not just about food, it is also about fun, nature-connected culture and community. This emerging and vibrant AFN could blossom further with the right support such as viable markets and extra networking capacity. Such blossoming would enable those already using sustainable practices to thrive and encourage a greater volume of new entrant and young farmers to undertake organic and NA practices. This would likely create ripple effects, such as providing organic school lunches sourced 100% from the locality and ensure the future of farming and biodiversity in Sado. Expanded capacity of networking roles and more facilities could also ensure the continuation and expansion of sustainable food processing as well as food and culture events. In order to attract and sustain new actors, emphasizing and supporting the diverse facets of fun which arise from working within the AFN, (e.g., sense of community, achievement, working in partnership with nature), will be important. Further, ensuring inclusivity through diverse sustainable practices and demographics of AFN actors will also be of importance. As highlighted by rural revitalization officer interviewees, and through my own experience, creating clear communication and careful listening is vital to building trust and motivating sustainable activity. Building on existing AFN communities while focusing on connecting open-minded residents to new entrants may prove more successful for those relocating and lead an example for residents who are less open to change and inclusivity.

Sado's AFN is a good example for other areas nationally and internationally, who could learn from the community efforts to retain human-nature connected culture alongside food, such as the traditional ceremonial dances and music events where local food is sold and that are offered together with farming experiences. Helping residents, especially youth who struggle to see a future for themselves in this rurality, realize the global significance of their traditional culture and current efforts at sustainable farming could engender a sense of pride and motivation to work locally in rural and environmental revitalization.

Policy needs to better recognize the importance of people and their connection to nature through sustainable socio-ecological production landscape activities, instead of scaling up technology and increasing trade. Putting people with the motivation to care for the environment through their production at the center can provide better wellbeing for both people and other living beings. Enabling more new entrant farmers is likely the biggest challenge for realizing a progression toward greater sustainability in Sado's AFN.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The requirement of ethical approval was waived by IFI Administration office, Project Management Team for the studies involving humans because IFI Administration office, Project Management Team. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

JB: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing.

Funding

The author(s) declare financial support was received for the research, authorship, and/or publication of this article. The author would like to thank the Japan Society for the Promotion of Science (JSPS) for providing funding and the opportunity to undertake this research as a fellow, under the JSPS KAKENHI grant number JP 22KF0078.

Acknowledgments

The author would like to thank their colleagues Hsin-Hua Chiang and Yuki Sano at the IFI, University of Tokyo, for being great aids in navigating interviews in Sado, and Kensuke Fukushi for introducing me to Sado island. Thanks to the UN University for providing the opportunity for this research fellowship under their Satoyama Initiative. The author would also like to give great thanks to all the people and communities who so warmly allowed me to participate in their lives and activities during my year of research in Sado.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsufs.2024.1346129/full#supplementary-material>

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OPEN ACCESS

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RECEIVED 10 January 2024

ACCEPTED 24 April 2024

PUBLISHED 07 June 2024

CITATION

Kondo C, Zollet S, Kobayashi M and
Yamamoto N (2024) Fifty years of *Teikei*: the
evolution of the movement's ten principles
and its impact on alternative food initiatives in
Japan.

Front. Sustain. Food Syst. 8:1368253.
doi: 10.3389/fsufs.2024.1368253

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Fifty years of *Teikei*: the evolution of the movement's ten principles and its impact on alternative food initiatives in Japan

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Introduction: Japan's *teikei* movement, recognized as a source of inspiration for Community Supported Agriculture (CSA) in Western countries, is now entering its fifth decade. Built upon trust and shared values, *teikei* has continued to rely on mutually supportive relationships between organic producers and consumers. The movement's commitments were originally articulated through the *ten principles of teikei*, which offer a roadmap to create food systems based on solidarity principles going beyond market transactions. Despite a decline in numbers, *teikei* groups continue to operate in the midst of societal shifts that are altering food practices and consumption patterns. These changes have had an impact on the implementation of the ten principles and on the power dynamics between producers and consumers.

Methods: This research investigates how such shifts have affected the development of alternative food systems in Japan, the evolution of *teikei* as a social movement, and the tensions that arise from contrasting notions of agri-food system alterity rooted in decommodified relationships versus market-based transactions. We employ the ten principles as a framework to investigate the transformations of some representative *teikei* groups over time, and identify three types of shifts: relational, operational, and ideological. These shifts show how different *teikei* actors have been engaging in realizing the vision of building sustainable agri-food systems through alternative market relations.

Results: The shifts also underscore the fluid and situated nature of agri-food system alterity within historical, geographical, and cultural relational spaces. The current variations of *teikei* configurations and the progressive diversification of approaches to address the challenges of upholding the original principles demonstrate the movement's adaptability over time. However, they also demonstrate the necessity to strike a compromise between conflicting needs.

Discussion: The development of the *teikei* movement is not only important from an historical and geographically-situated perspective, but also as a dynamic and evolving experiment in the potential and challenges of active food citizenship. The democratic decision-making processes embedded within *teikei* principles and practices offer a valuable model for understanding how individuals enact their food citizenship and contribute to ongoing transformation of the agri-food system. Simultaneously, these shifts also serve as a warning against how democratic principles can be eroded by conventionalization and neoliberalization, and about the assumptions that arise during the process of building alternative agri-food systems, such as gendered labor.

KEYWORDS

teikei, community supported agriculture, alternative food networks (AFNs), organic agriculture, social movements, food citizenship, gender issues, commodification and decommodification

Introduction

In 2021, the Japan Organic Agriculture Association (JOAA) celebrated the 50th anniversary of its establishment. JOAA was founded as a national-level platform where concerned farmers, doctors, scholars, consumers, and other parties involved in agri-food research and policy came together to promote organic agriculture and challenge the industrialization of the Japanese agri-food system. The founding of this organization represents a key historical marker in Japan's organic agriculture movement. Notably, the JOAA also played an important role in the development and spread of alternative systems of production and consumption, as it served as an informal networking structure for direct producer-consumer partnerships known as *sansho-teikei* (literally “producer-consumer cooperation”; hereafter *teikei*). Although *teikei* is often cited as the inspiration behind Community Supported Agriculture (CSA) in western countries (Hatano, 2008), *teikei* practices cannot be directly equated to CSAs or other Alternative Food Network (AFN) models found in western literature. *Teikei* first emerged as a cooperative-oriented social movement committed to addressing various concerns within the agri-food system, and emphasized the collective, ethical, and de-commodified dimension of producer-consumer relations, which sets it apart from more market-oriented arrangements.

In its original conceptualization, *teikei* served as the actualized practice of the organic farming movement and its ideals. For instance, *teikei* put into practice the belief that relationships between producers and consumers should not be based on market transactions but rather on trust, democracy, mutual support, and co-participation in shaping an alternative food system (Masugata, 2008). The commitments underpinning *teikei*'s practice were eventually enshrined as the “ten principles of *teikei*,” established by JOAA in 1978 (see Table 1). These principles were distilled from the experiences of the initial *teikei* groups and subsequently used by *teikei* members as a blueprint to define the terms of their partnership and logistical operations. As hundreds of grassroots *teikei* groups emerged throughout Japan, these principles also helped to connect and unify the groups as a social movement.

As with other social movements that flourished in the 1970s in Japan,¹ *teikei* groups saw a gradual decline in their membership and participation over the following decades (Hatano, 2008). Deep socio-economic and demographic structural shifts, such as the rise of neoliberal policies, the erosion of the breadwinner model—resulting in the increased participation of women in the workforce—along with the overall burst of the bubble economy in the 1990s, caused increased precarity and the shift away from social activism, contributing to the decline of the *teikei* movement. However, even though many of the original *teikei* groups terminated their activities, some underwent deep transformations to adapt to an increasingly individual-based and convenience-oriented society (Kondo, 2021).

Although the evolution of *teikei* has been partly addressed in previous works (most notably Kondoh, 2015), publications on *teikei*'s recent developments are scarce, not only in English but also in Japanese.

This research therefore contributes to the literature on the movement, but also, more broadly, to scholarly works on AFN transformation. In the paper, we first outline the historical development of the *teikei* movement and situate it within the international literature by examining how its principles relate to other conceptualizations of AFNs. We then employ the ten principles as a framework to examine the organizational and structural changes experienced by four major *teikei* groups that have remained in operation, showing how they have evolved into distinct models and how the ten principles have been variously compromised, replaced, or maintained in the process. We also explore newly emerging *teikei*-like practices initiated by a new generation of organic farmers to assess the continued relevance of the *teikei* principles.

In the discussion, we reflect on what the changes in *teikei* represent for the development of more fair, resilient and sustainable agri-food systems in Japan and elsewhere. In particular, we discuss how the changes in the application of the ten principles reflect tensions between social-movement-oriented and market-based AFNs, tensions that have been driving the transformation of *teikei* groups over time. The changes within *teikei* also resonate with contemporary debates on how AFNs can be truly transformative, and on the importance of strengthening the social role of alternative agrifood arrangements by foregrounding principles such as food democracy or food citizenship (Hatanaka, 2020). A critical reflection on *teikei*'s history and evolution therefore provides valuable lessons for AFNs around the world that are struggling to come to terms with similar tensions and vulnerabilities in their mission to transform food systems. Through our analysis, we hope to offer new perspectives on the opportunities and challenges faced by AFNs in the current landscape of corporatization of organic agriculture and neoliberal capitalism (Johnston et al., 2009).

The historical evolution of *teikei*

Japan's rapid ascent to becoming the world's second largest economy between the 1960s and 1980s was accompanied by rapid urbanization and industrial sector growth, leading to a decline in the agricultural sector and rural economies. At the same time, in an effort to meet the escalating demand for food production and alleviate income disparity in rural areas, the Japanese government promoted land consolidation, specialization and agricultural industrialization. This led to a steep increase in the use of inputs such as synthetic fertilizers and pesticides. At the same time, environmental and food pollution scandals associated with industrial development and industrial food processing became a major source of concern, prompting the mobilization of concerned consumers, farmers, and other stakeholders around the effort to build safer and more equitable systems of food provision (Kondoh, 2015; Hatanaka, 2020). This mobilization gave rise to the first *teikei* arrangements, initially formed as collective purchasing groups; Kondoh (2015) provides a detailed account of how these first groups were formed and how they operated.

In most cases, it was consumers—particularly female homemakers—who initiated contact with farmers, asking them to transition to organic production methods. In exchange, they committed to purchasing the farm's entire harvest and providing volunteer labor for harvest and distribution (Masugata, 2008). Although producer-led *teikei* groups exist, the *teikei* movement was predominantly developed through consumer-led initiatives, with female homemakers self-organizing into groups and reaching out to

1 Several social movements were prominent in 1970s Japan, including anti-pollution and anti-development protests, consumer cooperative movement, and new civic groups in the mid-1970s. Japan's postwar period was a time with many activists and intellectuals participating and organizing grassroots activities such as collective purchasing and study groups (Avenell, 2010).

TABLE 1 The ten *teikei* movement principles established by JOAA.

<i>Ten principles of teikei</i>
1. Principle of mutual assistance. The essence of this partnership lies, not in trading itself, but in the friendly relationship between people. Therefore, both producers and consumers should help each other on the basis of mutual understanding. This relation should be established through the reflection of past experiences.
2. Principle of intended production. Producers should, through consultation with consumers, intend to produce the maximum amount and maximum variety of produce within the capacity of the farms.
3. Principle of accepting the produce. Consumers should accept all the produce that has been grown according to previous consultation between both groups, and their diet should depend as much as possible on this produce.
4. Principle of mutual concession in the price decision. In deciding the price of the produce, producers should take full account of savings in labor and cost, due to grading and packaging processes being curtailed, as well as of all their produce being accepted; and consumers should take into full account the benefit of getting fresh, safe, and tasty food.
5. Principle of deepening friendly relationships. The continuous development of this partnership requires the deepening of friendly relationships between producers and consumers. This will be achieved only through maximizing contact between the partners.
6. Principle of self-distribution. On this principle, the transportation of produce should be carried out by either the producer or consumer's groups, up to the latter's depots, without dependence on professional transporters.
7. Principle of democratic management. Both groups should avoid over-reliance upon limited number of leaders in their activities, and try to practice democratic management with responsibility shared by all. The particular conditions of the members' families should be taken into consideration on the principle of mutual assistance.
8. Principle of learning among each group. Both groups of producers and consumers should attach much importance to studying among themselves, and should try to keep their activities from ending only in the distribution of safe foods.
9. Principle of maintaining the appropriate group scale. The full practice of the matters written in the above articles will be difficult if the membership or the territory of these groups becomes too large. That is the reason why both of them should be kept to an appropriate size. The development of this movement in terms of membership should be promoted through increasing the number of groups and the collaboration among them.
10. Principle of steady development. In most cases, neither producers nor consumers will be able to enjoy optimal conditions from the very beginning. Therefore, it is necessary for both of them to choose promising partners, even if their present situation is unsatisfactory, and to go ahead with the effort to advance in mutual cooperation.

farmers, encouraging them to adopt organic farming practices (Kimura and Nishiyama, 2008). This presents an interesting counterpoint to the rise of AFNs in Western contexts, where consumers—and women specifically—were not initially foregrounded as key players in the development of alternative agri-food systems (Goodman, 2004).

To understand *teikei*'s development, it is important to highlight the critical role played by female consumers in the movement and contextualize it within the broader context of Japan's economic boom. The 1960s–1980s witnessed both high economic growth and increased social awareness of environmental issues. This era saw the emergence of an expanding urban middle class, comprising urban-based, highly educated, and relatively affluent female homemakers, who played a vital role in the rise of the *teikei* movement. Despite the overall increase in women's educational attainments, in this period only a relatively small number of educated women fully entered the workforce, with many leaving the labor market after marriage or childbirth, or participating only as part-time workers (Shimada and Higuchi, 1985). Consequently, the 1960s–1980s became a period in which many educated female homemakers engaged in social activism and movement building activities, such as the consumer cooperative movement and parent-teacher associations (PTA) (Hatanaka, 2020).

In parallel, the increase in environmental scandals and resulting pollution-related diseases also spurred many of these consumers, together with farmers and scholars, to organize and address the costs of industrial growth (Takagi, 1999; Germer et al., 2014). As interest in organic agriculture grew, its proponents felt the need for theoretical and practical guidelines for both producers and consumers. In this regard, the establishment of JOAA provided an organizational foundation to structure the nascent *teikei* groups. Importantly, the JOAA was predominantly male dominated, being a farmer-centric group, whereas many of the consumer groups involved in the *teikei* movement were led by women. Thus, the formation of the *teikei* movement and its principles emerged as the result of producers and consumers coming together.

The founder of JOAA, Teruo Ichiraku, later distilled the discussions, experiences and practices of the early *teikei* groups he was involved in into a set of principles, codified as the “ten principles of *teikei*,” in 1978 (JOAA, 2015; see Table 1), which came to represent the foundational philosophy behind *teikei*'s activities. The main motivation behind codifying the experiences of *teikei* groups into the ten principles was the desire to highlight how the movement's activities went beyond the mere marketing of organic produce. *Teikei* aimed to be an alternative distribution system of organic products based on mutual trust and support between producers and consumers, distinct from conventional economic transactions based on a “commercial relationship of buying and selling goods” (Masugata, 2008, p. 7). The ten principles detailed how to create an alternative food system based on decommodified food system relationships. Furthermore, the structure and functioning of *teikei* groups were based on democratic deliberation and shared decision-making. In this sense, they represented early experimentations in food citizenship, with citizen-consumers and citizen-producers engaging in meaningful participation over decisions related to the production and consumption of food (Hatanaka, 2020).

The number of *teikei* groups peaked in the early 1990s, with about 300 groups throughout the country (Hatano, 2013). While most groups were concentrated in urban areas such as Tokyo and the surrounding region, most prefectures had at least one *teikei* group (see Figure 1). Based on data collected on *teikei* groups in 1991, the median group size was around 110 members. Figure 2 provides a geographic breakdown of where *teikei* activity was strongest. Despite there being the greatest number of groups in Tokyo, Osaka Prefecture had the highest number of members participating in *teikei*.

Over time, *teikei* groups evolved into three main types (Hatano, 1998). The first type consisted of organized farmer groups connected to organized consumer groups. The second type was characterized by non-organized farmers selling to organized consumer groups, and the third consisted of non-organized farmers selling to non-organized

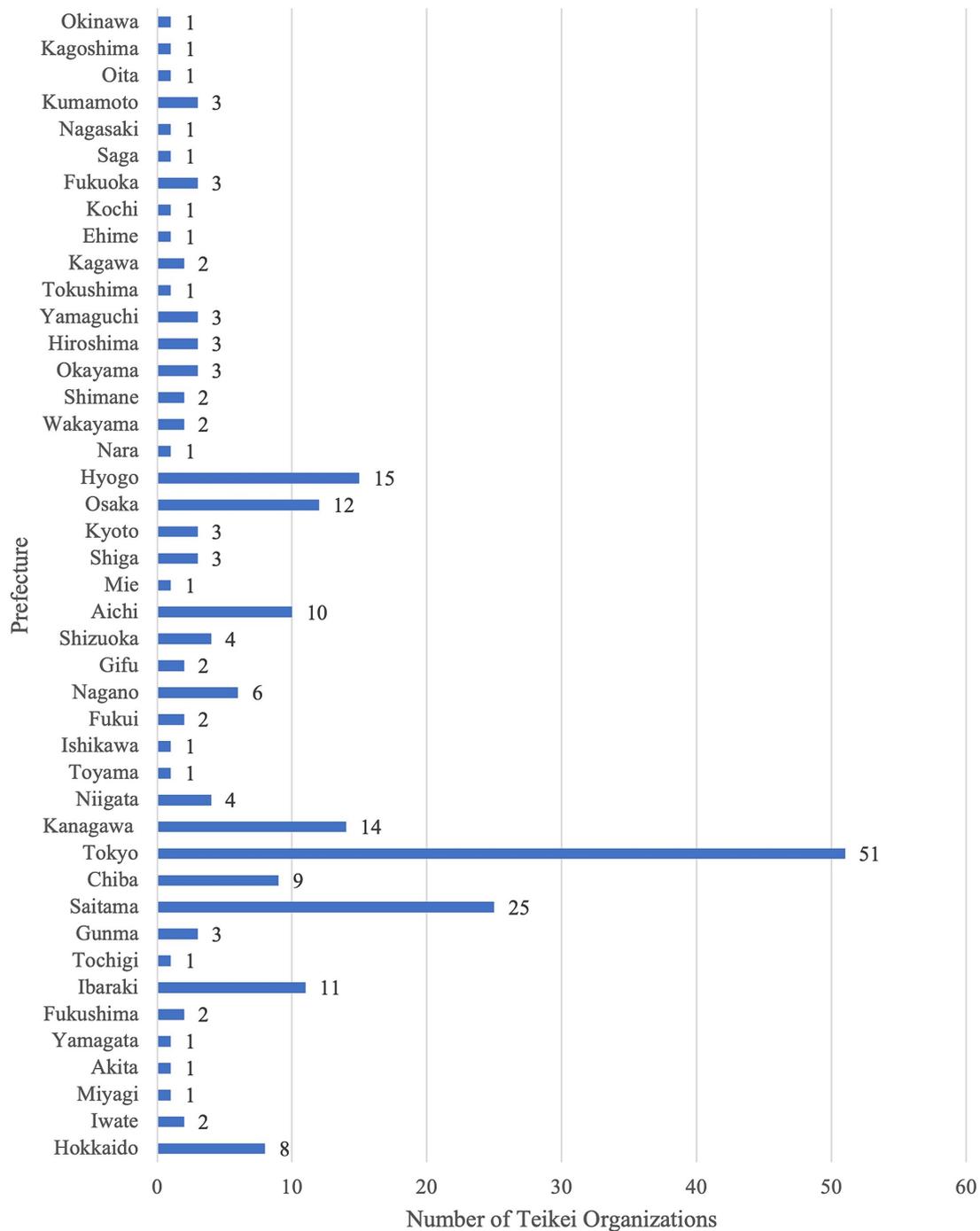


FIGURE 1
Number of *teikei* organizations in 1991. Source: adapted from *Kokumin Seikatsu Sentā* (1991).

consumers. The terms “organized” and “non-organized” refer to whether farmers and consumers are associated into a formal group or a cooperative. The first and second types, common among *teikei* groups formed in the initial stages of the movement, are now in decline (Akitsu and Aminaka, 2010). The third type, which started emerging in the 1980s and is closer in structure to a vegetable box delivery service, has now become more dominant, especially among the younger generations of producers and consumers (McGreevy and Akitsu, 2016; Zollet and Maharjan, 2021a,b).

The decline of *teikei* groups, especially after the burst of Japan’s economic bubble in 1992, has been attributed to three main factors. The first is market diversification within the organic sector, with retailers expanding their services to offer door-to-door delivery (Hatano, 2008). The increased availability of convenient and reliable direct household delivery services for organic produce made consumer group initiatives less essential (Moen, 2000). Unlike the beginnings of the organic and *teikei* movements, organic agricultural products today can be purchased through a wider variety of channels, although they

remain less widespread compared to western Europe and the US. The second factor is a shift in perception regarding organic consumption. Products labeled “organic” have also partly come to be associated with desirable and affluent lifestyles for health- and environmentally-conscious—and primarily urban—consumers. Evidence of this trend is the proliferation of popular magazines portraying sustainable farming and countryside living as fashionable, as well as the increase of boutique shops, restaurants, and organic corners in department stores in larger cities (Osawa, 2014). The factors driving organic consumption also vary; a recent survey by the Ministry of Agriculture, Forestry and Fishery (MAFF) shows that the purchase of organic food is mostly connected to health concerns (22.6%) and effective marketing (20.3%), while environmental protection (7.6%) and animal welfare (3%) rank significantly lower (MAFF, 2019).

The third major factor that contributed to the decline of *teikei* groups was the increase of women entering the workforce, as *teikei* consumer groups heavily relied on the volunteer labor of female homemakers (Kondoh, 2015), coupled with increased work precarity and an aging population (Matanle, 2016). As a result, *teikei* groups are experiencing a lack of generational renewal, particularly among consumer members (Hatano, 2008). Similar changes have also been observed in other social movements, such as consumer cooperatives, where younger members prefer to avoid commitment to solidarity-oriented activism (Nishikido and Kado, 2009). Additionally, the decline of Japanese social movements and their failure to institutionalize their movements can be partly attributed to their fragmentation into small, localized organizations that lack professional staff, a phenomenon described by Pekkanen (2006) as “members without advocates” (p. 178).

Situating *teikei* within current AFN debates

As described in the previous section, *teikei* emerged as a social movement with a vision to build alternative market relations to address the negative externalities caused by the rapid industrialization and neoliberalization of Japan’s agri-food system. In this sense, *teikei* is similar to what are described as AFNs in Western European and North American contexts, insofar as “AFN” is used as an umbrella term to describe initiatives positioned as alternatives to various negative aspects of industrial agri-food systems (Seyfang and Smith, 2007; Tregear, 2011; Goodman et al., 2012). While AFNs may stand theoretically as forms of resistance to the dominant food system, however, the diversity of initiatives that fall under this concept embody a spectrum of practices often riddled with contradictions (DuPuis and Goodman, 2005; Guthman, 2008; Forssell and Lankoski, 2014; Zoll et al., 2021). At the core of many contemporary debates on AFNs is the tension between often-polarized conceptualizations of AFNs either as market-based arrangements or as social movements (Johnston et al., 2009; Misleh, 2022). This tension is also evident in the analysis of processes of commodification/decommodification of both the concrete acts of food production, provisioning and consumption, but also of the relationships accompanying them (Matacena and Corvo, 2019). Given that AFNs operate mostly within capitalist configurations and structures, they are also constantly exposed to the risk of co-optation and appropriation by conventional actors (Galt et al., 2016; Matacena and Corvo, 2019; Zollet, 2023). Much of the current AFN literature therefore questions how alternative agri-food initiatives can “avoid ‘selling out’ to capitalist

conformity and yet [provide] the economic security to perform and propagate these ethical values effectively” (Goodman et al., 2012, p. 245).

The tension generated by the need to “sell out” to survive is evident in the evolution of the *teikei* movement as well. Although *teikei* was born with a strong social movement orientation at its core, several of the original *teikei* principles and operational structures are increasingly difficult to uphold for the current generations of producers and consumers, who show declining interest in this aspect of *teikei*. In the next section, we examine the ten principles through the lenses of these debates, highlighting similarities and differences between the *teikei* movement and its Western counterparts. This exercise also responds to the call for more multidimensional and multidisciplinary approaches to understanding AFNs, their evolution and their diversity (Blumberg et al., 2020).

The ten principles as a framework to understand alterity and transformation in Japanese AFNs

The ten principles were written both as practical guidelines for producers and consumers engaged in *teikei* activities, but also as ethical principles aiming to communicate the moral values of the movement to all stakeholders. At the core of the ten principles lies the notion of mutual support, which distinguished *teikei* from short food supply chains and direct market arrangements that solely sought to eliminate intermediaries in order to maximize profits for farmers. While exchanges in the *teikei* movement still involve money, they are viewed as a means for people to connect with one another as individuals² with a common goal—the preservation of social and ecological health and well-being for a better future (Ichiraku, 1984). Accordingly, Principle 1 (Table 1) states that “the essence of the partnership [*teikei*] lies not in monetary exchanges, but in the friendly relationship [between producers and eaters],” founded upon equality, mutual understanding and assistance. Mutual support is central to *teikei* principles, and face-to-face interaction (e.g., by participating in meetings, or organizing volunteer work on *teikei* farms) was seen as crucial to the operation of early *teikei* groups (Akitsu and Aminaka, 2010). Although this practice reflects concepts such as proximity and resocialization (Dubois, 2018, 2019; Matacena and Corvo, 2019), there has been a tendency among Western AFN scholars to put considerably more emphasis on food (re-)localization and spatial reconnection as precursors of social reconnection (Feenstra, 1997; Hinrichs, 2003; Bowen and Mutersbaugh, 2014). *Teikei* principles, on the other hand, are more relationally- (rather than geographically-) focused in their approach, as they put little to no emphasis on food provenance and geographical boundaries (“local” food), and instead emphasize social reconnection through meaningful interaction (see also Principle 5).

2 Within the movement, there continues to be debate on the use of the term consumer and eater. Some prefer not to use the term “consumer” because the intention is for people to mutually engage in production and consumption, as producers are also consumers and the goal is for consumers to be more engaged in production. Rather than using the terms consumers and producers, others use the terms *tsukurite* (maker) and *tabete* (eater) referring to makers and eaters, respectively.

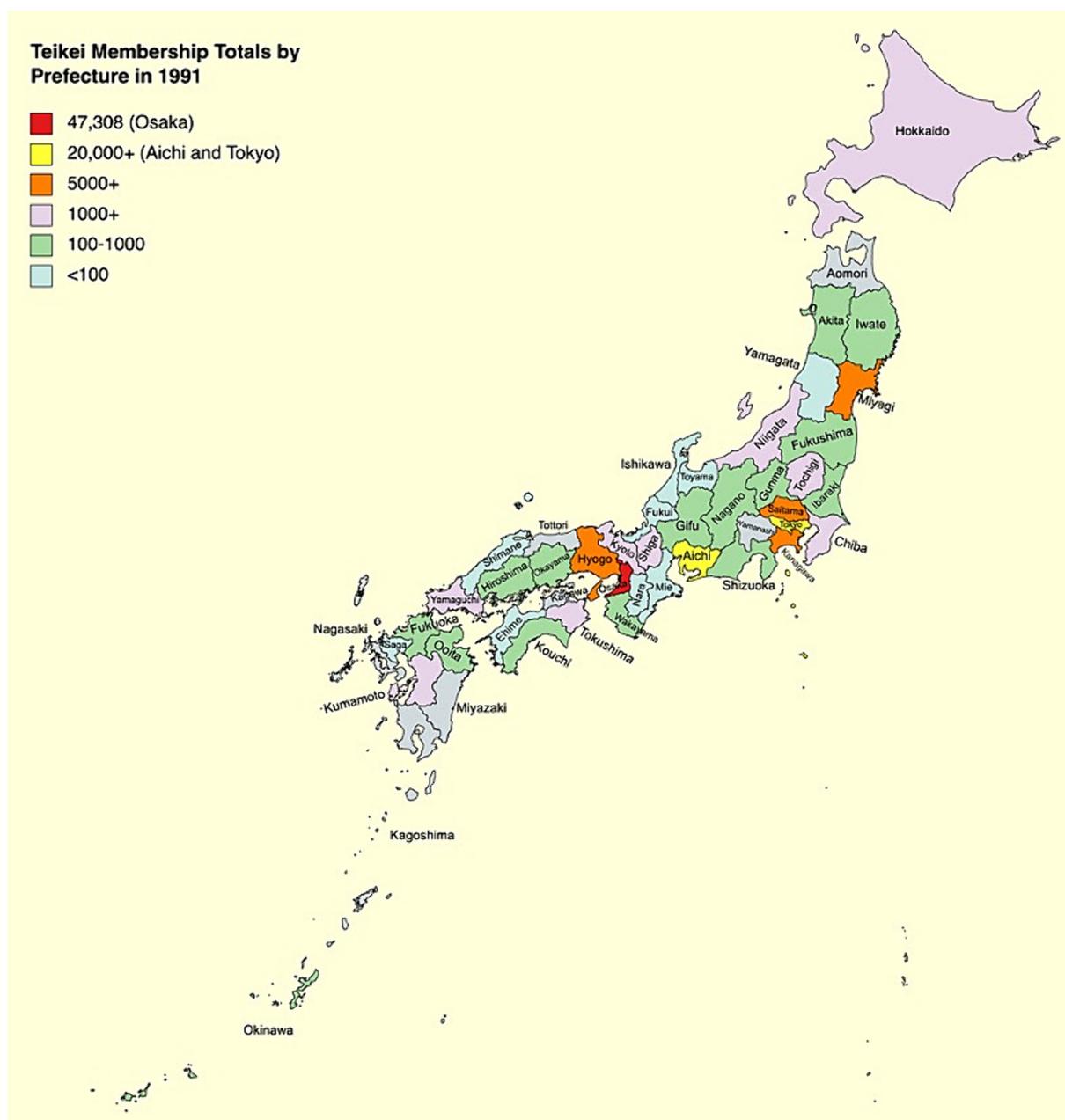


FIGURE 2
Map of *teikei* organizations in 1991. Source: adapted from Kokumin Seikatsu Sentā (1991).

This choice, however, was also partly due to circumstance. Some of the first farmers who decided to collectively switch to organic farming, for example, were located far—sometimes hundreds of kilometers away—from major cities where the urban consumer groups were located. In order to sell their produce, as their rural neighbors grew most of their own food, they had no choice but to send their produce to more distant cities (Kondoh, 2015).

The ten principles of *teikei* also highlight the importance of going beyond purely capitalist considerations in the production and consumption of food, while AFN literature has only recently started to explicitly engage with these aspects. Principles 2 (planned production), 3 (accepting all harvest) and 4 (mutual concession in setting prices), for

example, arose out of the understanding that, in order for farmers to be willing to make the switch from conventional to organic, external support (in this case from consumers, as there was no institutional support) was needed (Kondoh, 2015), and encouraged both producers and consumers to consider the multidimensional (more-than-monetary) benefits arising from their partnership (Emery et al., 2017; Blumberg et al., 2020). In this regard, *teikei* principles spelled out from the beginning the importance of post-capitalist values such as solidarity and de-commodification of food production and consumption. Interest in these aspects has emerged within AFN literature relatively recently, as a result of the growing interest in new economic models and approaches and their application to agri-food issues. For instance, Rosol

(2020) examines the alterity of AFNs through the post-structuralist diverse economies frameworks to explore the complex co-existence of capitalist and non-capitalist elements.

The *teikei* principles also emphasize aspects such as diversity, self-sufficiency, and autonomy, which are less commonly discussed in Western AFN scholarship, but find common ground with food sovereignty, agroecology, and peasant movement literatures (van der Ploeg, 2008; Maticena and Corvo, 2019). Principle 2, for example, encourages farmers to produce a “sufficient amount and variety of produce within the capacity of the farm,” and to think of consumers’ everyday food needs as an extension of the farmer’s own needs. Simultaneously, Principle 3 encourages consumers to structure their diet around what is produced by the *teikei* farms. Ultimately, the aim is to create a highly self-sufficient and relatively autonomous agri-food system. Self-sufficiency and autonomy are also highlighted by Principle 6 (self-distribution), which states that *teikei* groups should not rely on third parties for product distribution. While the AFN literature does focus on reducing intermediaries, this concept is mainly presented from the perspective of increasing sustainability (economic sustainability by removing costs along the supply chain; environmental sustainability by reducing transportation or excess packaging; and social sustainability by encouraging reconnection between food system actors) (Renting et al., 2003; Dubois, 2019). In the *teikei* principles, on the other hand, the lack of intermediaries reflects the orientation of the organic agriculture movement toward creating an autonomous, solidarity-based distribution system located outside the capitalist market (Kondoh, 2015) and supported by the labor and capital of all involved parties, according to their specific means and abilities.

Principle 7 focuses on the democratic management of *teikei* groups, which echoes later discourses around democratic participation in food systems, food citizenship, and civic food networks (Renting et al., 2012; Hatanaka, 2020). The emphasis on democratic management suggests ways for citizen-consumers and citizen-producers to work together to co-create a more robust and sustainable food system (Hatanaka, 2020). The focus on collective management is explained both by the history of Japan’s strong cooperative movement, which predates the emergence of the *teikei* movement, and more generally by Japan’s collectivist culture; unlike CSAs, most of the early *teikei* arrangements were formed by organized groups of farmers interacting with consumer groups (Parker, 2005).

Participation and democracy are also connected to learning (Principle 8). Recent AFN literature reflects an increased interest around the role of social learning and knowledge co-production in fostering more active participation in the food system (Andree et al., 2019). The emphasis on “learning” within *teikei* groups similarly reflects the aspiration of turning food-related exchanges into opportunities for education aimed at deeper social engagement and social change. However, while some early *teikei* groups were connected to other political movements (such as the antinuclear movement) (Masugata, 1995), the Japanese organic agriculture movement as a whole did not engage in social demonstrations and lobbying, but rather aimed at building an alternative system, encouraging its supporters to change their way of life as the most effective way to achieve social change toward a more life-affirming society (Kondoh, 2015). As such, no explicit roadmap was shared as a collective movement on how to lobby for and engender wider processes of societal change.

Finally, Principles 9 and 10 speak directly to issues of conventionalization and co-optation that, in recent years, have been rising to the forefront of both AFN- and organic farming-related debates (e.g., Johnston et al., 2009; Galt et al., 2016). Those who helped draft the *teikei* principles foresaw the risks inherent in allowing *teikei* groups to become too large, and the multiple disconnections associated with an overgrown membership. Specifically, Principle 9 suggests that the development of the movement should occur “through increasing the number of groups and the collaboration between them,” rather than by consolidating and increasing the size of each group. Therefore, *teikei* founders envisioned the scaling of AFNs through “scaling out” of individual networks and connections, rather than through “scaling up” in size. The dilemma of scale has recently been problematized in the international AFN and CSA literature, as they advocate for the growth and expansion of AFNs but also point out the dangers of conventionalization inherent in scaling-up processes (Nost, 2014; Connelly and Beckie, 2016; Milestad et al., 2017).

To summarize, compared to other conceptualizations of AFNs, the *teikei* principles lack an explicit spatial focus (in terms of the geographical provenance of food and of the centrality of “local” food), but rather emphasize the relational aspects of food exchanges. They also favor a collective rather than individual approach, as shown by the cooperative-inspired structure of *teikei* groups and the emphasis placed on democratic management and decision-making between consumers and producers, as well as on social learning processes. Furthermore, they are forthright in their post-capitalist orientation, as shown by their emphasis on decommodified exchanges and their caution against cooptation.

At the same time, some key elements addressed by AFNs outside of Japan are not explicitly addressed by the *teikei* principles. The two most prominent aspects are the engagement with policy-making and advocacy (Andree et al., 2019; Candel, 2022), and the focus on the social and economic accessibility of sustainably-grown food in society as a whole, which is often discussed in food justice and food democracy scholarship, including in relation to CSA (Andreata et al., 2008; Verfuert et al., 2023). The apparent contradiction between the democratic orientation of *teikei* groups and the lack of direct political action may be explained by Japan’s robust tradition of cooperative initiatives (which prohibited association with any political party), along with a strong group-oriented culture, which facilitates collective decisions within groups; in contrast, Japan’s political landscape has been characterized by elitism and a somewhat authoritarian approach to public policy (Parker, 2005).

The lack of attention given to the accessibility of organic food to low-income households can be attributed to the period of rapid economic growth in postwar Japan. During this time, the perception of Japanese society as egalitarian, with the entire population belonging to the middle class (referred to as *ichioku sōchūryū*, lit. “a middle class nation of 100 million [people]”) became firmly established and widely accepted (Chiavacci, 2008). Consequently, issues such as poverty and food democracy were not seen as priorities even among *teikei* groups. Although research in the 1970s revealed the existence of a significant population living in poverty, this was overlooked by mainstream research and society (Asai et al., 2008). Moreover, the belief that no one could go hungry in Japan due to its wealth and abundance of food was widespread under the concept *ichioku sōchūryū* (Abe et al., 2018). *Teikei* groups, to some

extent, continued to adhere to this belief, placing more emphasis on making better (or wiser) food choices for you and your family than on food justice or food security for us all (Yamamoto, 2023). Furthermore, until recently policy discourses about food (in)security in Japan predominantly centered on national level food self-sufficiency, which has been steadily declining and has raised concerns about increasing dependency on food imports and food safety (Assmann, 2010; Kimura, 2018). These narratives appeared more pressing to *teikei* groups and to the JOAA as well, leading to a stronger focus on revitalizing Japanese agriculture and rural communities through organic farming and *teikei* partnerships.

After situating *teikei* and its principles in the broader context of global AFN literature, in the following sections we employ the ten principles as a framework to assess the organizational and structural changes of *teikei* groups over multiple decades and to explore the evolutionary trajectory of the *teikei* movement in Japan. In the results, we highlight relational, operational, and ideological shifts in the understanding of the ten principles and in their practical application. In the discussion and conclusions, we return to the points highlighted in this section to outline and discuss the broader implications of *teikei*'s evolution in relation to AFNs' transformational role, both in Japan and elsewhere. We also highlight the way in which micro-scale processes within AFNs interact with macro-scale dynamics of social and economic transformation (Misleh, 2022).

Methodology and research sites

This paper employs multiple sets of data on both *teikei* groups and farms that operate with practices similar to *teikei*. Data was collected through four different research projects conducted separately by the authors in Kyoto prefecture (2017–2021), Mie and Osaka Prefectures (2020–2021), and Hiroshima Prefecture (2016–2020), as well as through online interviews conducted in 2021 (Table 2). Although the research projects employed various research designs, they collectively provide insight into the dynamic evolution of alternative food movements in Japan, with a particular focus on *teikei* and *teikei*-like organizations. In order to ensure coherence and relevance to the objectives of this paper, we utilized a methodological approach inspired by theory building from case studies (Eisenhardt and Graebner, 2007). Our careful selection process within our dataset led us to focus on four *teikei* groups, chosen for their potential to offer valuable insights for theory development.

These groups were selected because they (a) originated during the early stages of the *teikei* movement and have since maintained continuity, and (b) illustrate diverse trajectories of evolution and adaptation resulting in various outcomes. This methodological emphasis highlights the strength of our research approach while still acknowledging the limitations inherent in the diversity of research designs utilized. We also added a fifth case study, which is not an organized group, but rather a selection of individual organic farmers with a *teikei*-like operational structure. These farmers belong to the third typology described in Hatano (1998) classification and were included because they represent an increasingly common form of consumer-producer relationship. Taken together, the five case studies represent different typologies of *teikei* styles (consumer-led, producer-led, larger versus smaller, as well as organized versus non-organized groups).

Below we describe each case study in detail, and for the four *teikei* groups we briefly outline key shifts in their organizational and operational structure (see also Table 2).

- (1) *Tsukaisute-Jidai-wo-Kangaeru-Kai* (“Association to Collectively Reflect on the Disposable Society”), hereinafter “*Kangaeru-kai*”

Kangaeru-kai, a non-profit organization (hereafter NPO) and consumer-led *teikei* organization based in Kyoto City, was established in 1973 as a response and critique of mass production and mass consumption trends in contemporary society. The NPO oversees *teikei* activities such as farm visits, study meetings, and cooking workshops. *Kangaeru-kai* established its own internal distribution company in 1975, known as *Anzen Nosan Kyokyu Center* (translated as “Safe Agricultural Produce Supply Center”) (hereinafter “*Anzen-nosan*”), which operates as a socially responsible business. Members of *Kangaeru-kai* become members of *Anzen-nosan* and place their food orders each week in addition to the weekly vegetable set. Membership reached its peak in 1991 with 1,855 members. Today, *Kangaeru-kai* has approximately 1,300 members, maintaining solidarity-oriented activities based on daily food practices and skill-and-relationship-building.

- (2) *Daichi-wo-mamoru-kai* (“Association for the Protection of the Land”) hereinafter “*Daichi*.”

Daichi was first established in 1975 as a citizen-led group that organized a pop-up market to sell organic vegetables in Tokyo, aiming to “transform society through food.” After its initial success, in 1977 *Daichi* became a joint-stock company, despite significant protests against its transformation into a for-profit entity. The group, however, maintained its social activism by establishing the NPO *Daichi-wo-mamoru-kai*. In 1985, *Daichi* started Japan's first door-to-door delivery service of organic produce, which led to an exponential increase in their membership. Throughout the 80s and 90s, as the company grew it expanded its produce lineup to include meat (including fish), dairy, and processed foods. In 2017, *Daichi* merged with Oisix, an online organic produce delivery company. Today they are a part of a conglomerate business called *Oisix-Ra-Daichi*, offering a range of services such as kit meals, organic produce delivery, and prepared foods. Current membership stands at 45,196 (as of December 2021).

- (3) *Hirakata Shokuhin Kōgai to Kenkō wo Kangaeru Kai* (Hirakata Thinking about Food Contamination and Health) also referred to *Yasai-no-kai* (Vegetable Club), hereinafter “*Yasai-no-kai*.”

Yasai-no-kai is a consumer-led *teikei* group, established in 1975 by 72 housewives concerned about food scandals and health issues. It is located in Hirakata City, a suburb of Osaka. *Teikei* activities are carried out by consumer and producer members who organize the collection of harvests, processing of weekly boxes, and distribution. They have their own newsletter that is sent out with the vegetable boxes, and the group carries out regular meetings to discuss organizational affairs. Currently, *Yasai-no-kai* is a smaller group with approximately 50 members and four primary producers. The group also organizes its own social activity circles to continue community building efforts and provide spaces for deeper relationship building.

TABLE 2 Overview of case studies.

Group name/size	Establishment date	Producer #	Consumer member #	Region	Timeline/Description
Daichi (now Oisix-Ra-Daichi after 2018 merger)	1975 as an “environmental NGO,” 1977 as a stock company	1500 contract farmers with Daichi (as of 2017)	Approx. 46,000 (as of 2017)	Tokyo Prefecture	<p>1975: Foundation of “<i>Daichi-wo-mamoru</i>” citizens group dedicated to the sales of organic produce.</p> <p>1977: Members of the citizens group establish a joint-stock company “<i>Daichi</i>” to manage their business activities and an NGO “<i>Daichi-wo-mamoru-kai</i>” for their social activism.</p> <p>1980: Initiated branch management with wholesale, meat and marine products, as well as processed foods.</p> <p>1985: Initiated home delivery services</p> <p>2010: After changing the company name to “<i>Daichi-wo-mamoru-kai</i>” in 2008, officially combined the company and the NGO.</p> <p>2017: Merger with <i>Oisix</i> to become <i>Oisix dot Daichi</i></p> <p>2018: Acquisition of <i>Radish Boya</i> (an organic food delivery company) to become <i>Oisix Ra Daichi</i></p>
Kangaeru-kai	1973	64 (incl. Processed food and ingredients*2) 32 (vegetable and rice) (as of 2019)	1,250 (2021)	Kyoto Prefecture	<p>1973: 10 people formed a group to collect newspapers for recycling, and started to distribute “safe” farm produce</p> <p>1975: Foundation of Anzen Nosan, the distribution body with staff dedicated to distribution. Started with 324 members, which exceeded 1,000 the following year.</p> <p>1984: Distribution center with cooling facility was built.</p> <p>Late 1980s and 1990s: System improvement introduced to meet the needs of consumer members for quantity and quality of farm produce.</p> <p>1991: Reached the membership peak with 1855 members.</p> <p>From late 1990s to early 2000s: Radical change in distribution system shifting from collective to individual, such as collective bulk distribution system of farm produce ended, order systematization and individual delivery introduced.</p> <p>2010s: Members dropped but keeps approx. 1,300. Small number of members are still active organizing learning activities about 200 days in a year.</p>
Yasai-no-kai	1975	4 (2021)	150	Osaka Prefecture	<p>1975: formed a study group for mothers to study impact of health and food safety</p> <p>1980: peak membership with 500 members delivering weekly produce box with the support of 30+ volunteers and 10+ staff</p> <p>1997: stopped acceptance of entire harvest from farmers and increased price of vegetables</p> <p>2005: critical turning point, membership falls to half</p> <p>2010s: transitioned admin staff to younger generation working with 4 primary producers</p>
Iga Yūki	1980	17 (2021)	300	Mie Prefecture	<p>1984: formed as a producer group starting with 3 producers using food to provide alternative thinking to the pursuit of efficiency and convenience.</p> <p>1988: engaged in anti-nuclear movement and held study groups on organic farming, ethical poultry, and aquaculture</p> <p>2000s: accepting farm apprentices to increase the number of farmers in the group.</p> <p>2010s: 7 new and beginning farmers join and greatly expand their own <i>teikei</i> distribution network to 300+ households.</p>

(Continued)

TABLE 2 (Continued)

Group name/size	Establishment date	Producer #	Consumer member #	Region	Timeline/Description
Individual new entry organic farmers employing <i>teikei</i> -inspired model in Hiroshima Prefecture	Various	Individual producers	Varies (10–90)	Hiroshima Prefecture	12 farmers sampled purposely among new entrants (defined as individuals starting agriculture from a non-farming background) organic farmers. Almost all the respondents had been farming for less than 10 years at the time of the interview and had started no earlier than 2010. The only exception is a veteran organic farmer who started in the 1970s as an individual <i>teikei</i> farmer. The farmers are predominantly diversified vegetable (30–60 types) and rice farmers. They practice a “ <i>teikei-like</i> ” distribution system characterized by weekly vegetable box deliveries to individual households. Recipients are both local consumers (within the prefecture) and geographically distant ones, located mainly in major cities such as Tokyo.

(4) *Iga Yūki-nousanbutsu-kyōkyū-center* (Iga Organic Produce Supply Center), hereinafter “Iga Yūki.”

Iga Yūki was established as a producer-led organization with three farms in 1984. Their founder initially served as the head farmer for *Kangaeru-kai* before starting a localized distribution network for farmers in Iga City, located in Mie Prefecture. The group currently includes 17 farmers, for whom the group coordinates the distribution of produce to several markets. These include their own *teikei* network of over 300 households located in Iga and Nabari City (the neighboring city), as well as *Kangaeru-kai*, some consumer cooperatives in the Kansai region, and a few organic supermarkets.

(5) Individual new entry organic farmers employing *teikei*-inspired practices.

Although most young and new entry organic farmers tend not to explicitly label themselves as *teikei* farmers, many of them did apprenticeships with older farmers who were themselves part of the *teikei* system, and their operations are often shaped by the *teikei* model (McGreevy et al., 2021; Zollet and Maharjan, 2021a). Unlike the early *teikei* pioneers, however, the new generation of organic farmers tend to have more diversified sales outlets (*ibid*) and to be influenced by ideas and models from abroad (such as CSA), as many have experienced traveling or living overseas. In this paper we use a sample of farmers from Hiroshima prefecture, but the authors’ field experience, as well as previous literature (see, e.g., McGreevy et al., 2019) suggest that these characteristics and practices are common among new organic farmers throughout Japan.

The data sources used in this paper are primarily qualitative, and include interviews, participant observation (during events, community meetings, processing and farm work assistance), and the analysis of supporting documentation. To address gaps in our data about *teikei* typologies and their evolution, we also conducted additional fieldwork in 2021. The sample for the first case study (*Kangaeru-kai*) includes interviews with 34 members (23 consumers, three producers, five board members, and three full-time staff). Additional data was collected through a questionnaire survey ($N=586$) for all group members. Data for the second case study

(*Daichi*) was collected through an online semi-structured interview with a *Daichi* employee who has been with the company since 1991, as well as through detailed accounts of *Daichi*’s history documented by the founders (Ebisudani, 2015). The third case study (*Yasai no kai*) is based on semi-structured interviews carried out with 14 members, including both founders and recently joined members. In addition, interviews were also carried out with 3 of the 4 farmer members, together with shadowing on distribution routes. In the fourth case study (*Iga Yūki*) interviews were carried out with 8 consumer members and with 5 out of their 15 farmer members. The fifth case study includes 11 interviews with new entry organic farmers from different parts of Hiroshima Prefecture, selected because of their adoption of a *teikei-like* model based on the sale of weekly vegetable boxes to regular customers.

As the original data was collected without a shared research design, rather than attempting a direct comparative analysis this paper focuses on how each *teikei* organization transformed itself over time and how this reflects on the application of the ten principles. We used a grounded theory approach to examine the pooled corpus of qualitative data and identify commonalities regarding the evolutions of *teikei* groups through shared discussion based on field notes, experiences, and direct engagement with some of the groups explored in this paper. To strengthen our analysis of primary data, we also analyzed a variety of formal and informal publications produced by *teikei* groups (newsletters, activity reports) as well as policies related to organic agriculture and *teikei*. Two of the organized *teikei* groups are part of a regional organic agriculture consortium (*Yuukinougyou Kansai* group) that used to meet regularly and organize collective publications dedicated to sharing their thoughts and opinions regarding the direction of the *teikei* movement. Several of the individual farmers interviewed in Hiroshima Prefecture are members of the prefectural organic farming association (*Hiroshima ken Yuuki Nougyou Kenkyukai*), which is active in organizing events and meetings.

Through the combined re-analysis of existing data, we show how *teikei* groups have changed since the emergence of the movement. We also show different dynamics in the evolution of *teikei* and its principles through time, dynamics that can be observed among other *teikei* groups and organic farmers across Japan, as suggested by previous research (Hatano, 2008; McGreevy, 2012; Kondoh, 2015;

Yamamoto, 2020; Kondo, 2021; Zollet and Maharjan, 2021a). While we do not claim these case studies to be representative of all *teikei* typologies and possible evolution pathways, we hope they provide rich material to contextualize discourses and practices, opening up spaces for further theoretical development.

Results

Using the empirical data collected for the five case studies, in this section we outline the challenges that have emerged during *teikei*'s history and evolution over the last half century and how they reflect on the ten principles. The analysis of the changes occurring within *teikei* groups, as well as their current configuration, revealed three major “shifts”: (1) relational; (2) operational; and (3) ideological, which are discussed in the following sections.

Relational shift (principles 1, 2, 3, and 5)

A common theme shared across the case studies was the impact of individualized behavior, especially—but not limited to—among consumers. The rise in individualistic thinking was often described by interviewees as one of the reasons for changes in producer-consumer relationships. This relational shift is especially consequential to principles 1, 3 and 5, which clearly spell out the centrality of solidarity and mutual support in de-commodified relationships and the importance of engaging in direct interactions to nurture these relationships. The rise of individualistic behaviors is reflected in the changing organization of *teikei* groups, especially through the emergence of a more clear-cut division between consumers and producers. Over the years, a stronger emphasis on satisfying consumer needs has also emerged, shifting the focus away from the idea that consumers should be actively involved in production, processing, and distribution activities. *Teikei* relations between consumers and producers have become increasingly commodified over the last few decades to accommodate shifting needs and decreasing capacity to commit to de-commodified practices.

Consumer struggles

The shift away from solidarity toward a clearer divide between producers and consumers can be seen in the evolution of Principle 2 (intended production) and 3 (accepting all harvest). In the original *teikei* arrangements, these two principles were put into practice in two different ways. One was more farmer-centric, with farmers deciding what to put into the weekly vegetable deliveries—taking into account consumer's skills and needs—and consumers accepting what was provided. The other was based on more participatory and democratic decision-making, with farmers and consumers meeting before the start of the growing season to collectively decide what and how much to grow. Subsequently, all the harvest was delivered to consumers. In both cases, consumer members were generally expected to accept what they received without question, in line with Principle 3. Accepting all harvest is an essential component in *teikei*'s overall philosophy of providing food security for consumers and economic security for the producers. This principle, however, was one of the most contentious, even in the early stages of *teikei*. For consumers, it

was often a burden to receive excessive amounts of one type of produce during peak seasons. The practice of “accepting all harvest” has been discontinued by all *teikei* groups involved in this study. For groups such as *Kangaeru-kai*, there is a committee of members consisting of both producers and consumers that meets to coordinate planting schedules, and this committee collectively made the decision to limit the quantity of the same type of produce received by consumers. To deal with excess harvest, the organization now runs a small operation to process surplus crops through canning and pickling.

Another point of contention in accepting all harvest relates to blemished or misshapen produce. Initially, “imperfect” produce was considered a symbol of organic production—as opposed to the flawless appearance of conventionally grown produce sold in the supermarkets. Consumers were expected to accept all produce regardless of appearance, as this was considered a sign of solidarity with farmers in their efforts to produce organically (Yamamoto, 2021). However, with the overall mainstreaming of organic production and the improvement in farmers growing skills, leading to the increased availability of standardized, blemish-free organic produce in the market, consumers' stance toward the appearance of produce has shifted, with *teikei* members becoming more reluctant to receive “substandard” vegetables, in turn significantly influencing how the *teikei* system operates.

Producer struggles

Changes in Principle 1 (mutual assistance) are best exemplified by the decline of volunteer work within *teikei* arrangements. An older organic farming couple interviewed as part of the Hiroshima case study, for example, used to sell produce exclusively through a locally-based *teikei* group, and some of the farm operations (such as harvesting and distribution) were carried out with the help of local volunteers, primarily female homemakers. In recent years, however, the number of volunteers has dwindled, mainly due to long-term members getting older and to younger ones having full time jobs and no time to help on the farm. As a result, the farming household has shifted to relying on trainees for help on the farm, and distribution is now partially done through mainstream delivery services.

A decrease in the time to devote to volunteer activities has made upholding principle 5 (deepening friendly relationships through direct interaction) difficult, for both consumers and producers. In the past, both events and volunteer activities were organized by consumer groups so as not to further burden farmers. Among our case studies, the only *teikei* farm that has maintained the capacity to regularly host volunteer workers is *Kangaeru-kai*'s *teikei* farm “*Konoyubitomare-nojo*.” This is a collectively owned farm operated by producer members of *Kangaeru-kai* which regularly hosts volunteers and an apprenticeship program to train young organic farmers. Other producer members of *Kangaeru-kai*, however, expressed that hosting consumer volunteers—who often lack basic farming knowledge and skills—is time and energy intensive and therefore difficult to sustain, both from a practical and personal standpoint. Another farmer mentioned: “I stopped hosting consumers, as I felt like I'd rather spend time working on my own. I was raising my children, my wife was sick, and work needed to get done quickly.” In addition, many Japanese farmers (including organic) now have the option of hosting aspiring farmers through formal training and apprenticeship programs financially supported by the Japanese government (McGreevy et al., 2019), thus making the labor of consumer volunteers less essential.

Regular volunteer activities have partly or entirely been replaced by occasional farm events organized by the farmers, who host friendly educational experiences for visitors, often families with young children. Although most *teikei* groups in our sample were struggling to find the time and capacity to host and organize activities to maintain and strengthen relationships between producers and consumers, many *teikei* groups and individual farmers have remained committed to organizing farm events several times a year. While the emphasis has shifted away from providing volunteer labor toward more celebratory or educational purposes, these events still play an important role to reconnect consumers and producers. This is especially important for *teikei-like* arrangements initiated by new entry organic farmers, where the consumer's physical involvement in the farm's activities and face-to-face interaction have become relatively limited. These days, communication is maintained mainly through newsletters or online social networks, which, according to several of the farmers interviewed, are sufficient to establish personal trust between the two parties despite the physical distance. Despite this, however, in-person interaction is still considered essential to embed relationships not only within the social fabric of an alternative food network, but also through embedding the consumers within the farm environment. Furthermore, several of the new-entry organic farmers involved in this study noted that building and maintaining a network on one's own remains challenging, as it requires each farmer to possess enough social skills and charisma to attract consumers and catalyze their active participation.

Operational shift (principles 4, 6, 7, and 9)

Supporting producer livelihood

Since the late 1980s and early 90s, the members of *teikei* groups have declined, making it harder for producers to support their livelihoods only through *teikei* and forcing them to secure additional markets. For younger farmers, in particular, market diversification has become a necessity to earn sufficient income. One of *Yasai-no-kai's* producers, a new entry organic farmer, sells to a variety of markets including the *Yasai-no-kai teikei* group and his own weekly vegetable box scheme, where he distributes produce to a group of families in the same area connected to an alternative pre-school in Osaka. In addition, he also sells through an online organic produce distribution company which has become an important market channel for many organic farmers in the Kansai region. This company is not a *teikei* group, but aggregates produce from a large network of organic farmers and distributes via customized vegetable boxes and other markets such as supermarkets, boutique grocers, and restaurants.

An additional consequence of market diversification outside of *teikei* groups is a shift in production practices. *Teikei* farmers—and organic farmers more broadly—have emphasized from the beginning the importance of *shoryo-tahinmoku* (diversified farming), growing anywhere from 50 to 100 varieties of produce a year to supply their consumer members with a diversity of products. To meet the demands of multiple new markets, however, over time production and management efficiency have been prioritized. While many *teikei* farmers continue to grow a variety of crops, many have had to compromise their ideal of having highly biodiverse farms in favor of a more streamlined model able to meet expected production and market demands.

These changes in production and market practices have also impacted Principle 4 (mutual concession in price decision) as declining membership has made it difficult to balance production costs and consumer needs. As a producer-led *teikei* group, *Iga Yūki* represents an interesting case study on how to address challenges related to Principles 4 and 7 (democratic management) through their unique engagement with aggregation and market diversification. *Iga Yūki* has deliberately chosen to operate as a producer-led organization where producers coordinate and manage the production, and consumers are not as active. Producer members cooperate so that, collectively, they can ensure stable production in terms of both quantity and variety, without individual producers having to grow the full array of crops required by consumers. Farmer members of *Iga Yūki* decide which varieties to grow and are paid according to their harvest amounts at the price point collectively established by farmers themselves. The farmers then aggregate their produce and distribute it via multiple market channels, including their own *teikei* group, farm stand, consumer cooperatives, and supermarkets. Through managing diversified sales outlets, they can negotiate different sales prices, allowing them to provide more affordable products to their *teikei* members. Although this model has been successful, there have also been internal coordination difficulties among producers, as the need to have a diversity of produce at the group level means that not all farmers can choose to grow the highest value crops to increase their income. For instance, even though *daikon* radish is considered a labor-intensive low value crop in comparison to lettuce, which is a low-intensive, high value crop, farmers will be required to grow *daikon* radish to meet customer demand for diverse produce (Field notes, October 2020).

Distribution challenges

From a logistics perspective, the current practices of *teikei* groups have diverged from Principle 6 (self-distribution by *teikei* members), mostly as a result of the decline of volunteer work. Self-distribution is still practiced by small groups such as *Yasai-no-kai* and *Iga Yūki*, where the producers themselves carry out distribution activities. For new entry organic farmers using *teikei-like* operations, deliveries are done either directly by the farmer or by express courier, depending on the customers' location. Furthermore, in the case of surveyed Hiroshima farmers, although the majority of sales occur within the prefecture, a significant portion of produce is shipped to large cities outside of the prefecture, such as Tokyo and Osaka (see also [Zollet and Maharjan, 2021a,b](#)). In 2018, farmers had to face an increase in shipping costs across three major private Japanese shipping companies, leading to significant concerns among those farmers who rely on more distant markets. Furthermore, despite respondents' stated desire to serve local markets, the continued dependence on urban areas for vegetable sales represents a bottleneck, with consumers in smaller town and rural areas still growing their own food and/or being less interested in purchasing organic produce ([Zollet and Maharjan, 2020](#)).

Teikei groups that have expanded, such as *Kangaeru-kai* and *Daichi*, have restructured their distribution operations to accommodate a growing membership and multiple product sourcing, completely abandoning the principle of self-distribution. *Kangaeru-kai* established its own internal distribution company, *Anzen-nosan*, whose paid staff handles distribution logistics, alongside administrative tasks such as managing orders and payments. In this way, distribution is coordinated separately from the other *teikei* group

activities. However, because *Anzen-nosan* is not a third-party distribution company but a part of *Kangaeru-kai* itself, it still operates in line with many *teikei* principles. For example, *Anzen-nosan* publishes a newsletter, organizes farm schools for children, and coordinates farm visits with members of *Kangaeru-kai*.

In the case of *Daichi*, the effort to reach more people and expand their services nationwide drove the group's transformation into a more market-oriented company, which in turn led to a more pronounced diversion from principle 6. The group initiated a home delivery service in 1985, but when the group faced difficulties with the overall aging of their membership, it merged with other online delivery service companies, namely Oisix (vegetable delivery service which later expanded to meal preparation) and Radish Boya (organic produce delivery service). Oisix and Radish Boya cater to younger working families, who are attracted by the convenience of online home delivery of organic produce. As their operations grew, *Daichi*/Radish Boya were able to purchase much higher volumes of produce from organic farmers. The increased scale of their operations, however, also include aspects that contradict *teikei* principles. For example, their distribution system has fundamental inefficiencies. *Daichi*'s main distribution hub is in Tokyo, where all fresh produce and other food products are first aggregated and then distributed to their various delivery locations. In other words, it is common for an order of vegetables produced in Hokkaido, the northernmost island of Japan, to first go to Tokyo before being shipped back to a consumer in Hokkaido. Both this issue and the lack of face-to-face interaction among *Daichi*'s consumers can be ultimately seen as violating *teikei*'s 9th principle (maintaining the appropriate group scale). At a nation-wide scale, it is difficult to achieve the kind of distribution system envisioned by the *teikei* movement as trust is articulated through convenience and economic efficiency, essentially replacing solidarity between farmers and consumers.

Ideological shift (principles 8 and 10)

The founders and leaders of the *teikei* groups in our case studies established their respective organizations to engage in collective action, rooted in a philosophy where agriculture, health and the well-being of people and nature were intrinsically tied together. These groups were often connected through networking organizations, such as JOAA, but they also established additional coalitions to further promote Principle 8 (learning among each group). In the Kansai region, where many of our case studies are located, several *teikei* groups, including *Kangaeru-kai* and *Yasai-no-kai*, formed a regional coalition known as the *Yuki-nogyo-kansai-gurupu* (Organic Agriculture Kansai Group) to expand their collective action and engage in knowledge sharing and community building. The group self-published³ several magazines, which function as a tool for social learning and education around food citizenship. These publications are a legacy of the group's opinions and concerns about the current and future direction of the organic movement and help trace the

evolution of thoughts and shifting ideology around organic farming and *teikei*.

An 1988 publication by the group, for instance, discussed the growing divide between “conventionalized” AFNs and the original organic agriculture movement, with reference to a popular slogan used within the movement, “*kao-no-mieru-kankei*” (relationship between producer and consumer where you can see each other's face) (Hatano, 2008). This slogan refers to the notion of trust through personally knowing who grew the food, but is now used as a marketing strategy for selling local produce—usually not organic—distributed in conventional supermarkets, where the producer's face is visible to the buyer via a picture of the farmer (McGreevy and Akitsu, 2016; Zollet, 2023). For many organic agriculture movement activists, back then, this was a form of co-optation—a dilution of their movement's efforts for marketing purposes, which still persists today (Zollet, 2023).

A similar dilution process has occurred in relation to Japanese government policy around organic farming. In 2014, the MAFF approved the Basic Policy for the Promotion of Organic Agriculture, which included a definition of *teikei*. In this law, the definition and understanding of *teikei* was limited to the direct sale of agricultural products between farmers and consumers on a contract basis. Concepts stemming from the *teikei* principles, such as mutual trust, reciprocity, and shared understanding, on the other hand, were disregarded. Despite the contention this caused, many *teikei* groups did not advocate for stronger policy and for emphasizing mutual trust and cooperation, which relates to Principle 10. *Daichi*, for instance, opted to merge with organic online distribution companies that practice the superficial promotion of “*kao-no-mieru-kankei*,” mentioned above.

Even within the same *teikei* group, however, there can be contradictions and conflicts. According to the interview with an Oisix-Ra-Daichi employee, in the wake of the 2011 Tohoku earthquake and Fukushima Daiichi nuclear disaster, the Oisix arm of the company terminated contracts with farmers in the Tohoku region, while the Daichi arm chose to continue buying from farmers in the region, in the spirit of mutual cooperation with those long-term partners.

Finally, across all surveyed groups we also witnessed a generational gap. The founding farmer and consumer members of *teikei* groups, now in their 70s and 80s, still feel a strong sense of urgency toward agri-food system transformation, and focus on how their participation contributes to organic farming as a social movement. Many of the younger generation members, on the other hand, especially consumers, express a lack of interest or a lack of time and energy to engage beyond consumption, also shown by the declining participation in an array of *teikei* activities, from volunteer work to education seminars (Yamamoto, 2020; Kondo, 2021). Less participation in learning activities (Principle 8) further drives members' lack of awareness about agrifood system issues and promotes de-skilling (for example around food preparation). At the same time, although there has been a decline in the sense of urgency toward agri-food system transformation and in social participation in *teikei* activities, the idea of building trust and reconnecting eaters with food production and producers is still prominent in the activities of contemporary *teikei* groups and new entry organic farmers. In addition, among new farmers there is a higher awareness of, and interest around, different ways to organize organic farms and to interact with consumers. This is partly a result of the introduction of “imported” AFN models, such as CSAs and farmers' markets, which

³ This group continues to meet on occasion, but since the COVID-19 pandemic, one of the *teikei* groups has folded and they no longer produce publications.

have recently gained popularity, also contributing to the growing recognition of organic produce among consumers (Zollet and Maharjan, 2020). Many new entry organic farmers interviewed in our fieldwork, for example, were familiar with the term CSA and were interested in establishing one for their farm, but did not have a deep knowledge of the *teikei* movement and its history, a fact that reflects this generational gap but also the continued search for models suitable for each individual farm(er) and their circumstances.

Discussion: the challenges of sustaining efforts toward the creation of a self-sufficient, sustainable food system

The *teikei* movement represents one of the oldest and longest-lived examples of an alternative agri-food system, predating most AFNs in western contexts. However, over the last 50 years, *teikei* groups have undergone profound transformations to adapt to a changing economy and society, navigating the tension between commodification and de-commodification of alternative farmer-eater relational spaces. Through our analysis, we have identified three types of shifts—relational, operational, and ideological—that have taken place within *teikei* movements, and reflected on these shifts through the original framework of the movement represented by *teikei*'s ten principles. Although *teikei* still emphasizes the role of active food citizenship among its consumers and producers⁴ (Hatanaka, 2020), the capacity of *teikei* groups to practice mutual support and democratic decision-making between producers and consumers have been compromised and less evident. Specifically, there has been an expansion from a model centered around active citizen-consumers, toward being inclusive of different models of participation, most notable of which being the more passive consumer. Our field observations for the most part reveal a departure from initial intimate *teikei* experiences, where consumers shared risks in food production, participated in price decisions and produce distribution. In this discussion section, we summarize the key points that have characterized *teikei*'s evolution, and what they imply for the development of AFNs both in Japan and elsewhere.

One crucial aspect emerging from our analysis is the gendered dimension of food citizenship. Participation in *teikei* arrangements demands additional skills and time for sharing, preparing, and consuming the weekly delivered produce, which were tasks predominantly fulfilled by women, who have traditionally been the cornerstone of *teikei* groups. Despite Japan now having one of the highest populations of working women among developed countries, women are still considered the primary caretakers and food providers in a household. The sharing the burden of domestic responsibilities remains unequal, with the time required for food preparation disproportionately

falling on women (Kimura, 2011). Despite these changing pressures, *teikei* groups have not effectively engaged with the creation of convenient avenues for distributing, preparing and consuming the weekly produce for time-constrained members. Similarly, there has been little emphasis on shifting away from a gendered perspective on food purchase and preparation. The under-acknowledgement of the care work required to be a “food citizen” weakens the capacity to uphold *teikei* principles in the face of societal change.

Furthermore, despite the significant contributions made by women leaders of *teikei* groups in formulating the *teikei* principles, their contribution did not translate into leadership within the JOAA. The predominance of male farmer leadership may have contributed to a lack of effective coordination among *teikei* groups, keeping cooperation at the level of information exchange rather than engaging in more deliberate movement building. Finally, few convincing alternatives have emerged to replace the unpaid female labor that scaffolded much of *teikei*'s activities, but which also served as a key relationship-building activity and a bridge between producers and eaters. Nevertheless, Kondo (2021) describes the emergence of paid part-time work opportunities on some *teikei* farms, where working days are flexible and mothers are allowed to bring their children, creating a working environment that enables women to engage with (paid) work on farms in ways that better suit their needs. If such creative engagements had been introduced earlier in the 1990s, we might have witnessed a higher number of *teikei* groups in existence today.

Due to declining membership and the expansion of market channels for organic produce, *teikei* farmers have also had to increase specialization and market diversification, resulting in a partial compromise of ideals such as sustained engagement with consumer members and the maintenance of highly diversified and autonomous farms. The increased availability of organic produce in the market has also compelled producers to prioritize better service and blemish-free produce, resulting in a partial shift from co-production to a more consumer-centered approach. This shift has led to unbalanced power dynamics between producers and consumers, with farmers reverting to assuming most of the risks of production (Galt, 2013). *Teikei* groups have addressed these challenges in various ways, reflecting different degrees of commodification. For instance, *Daichi* embraced scale enlargement to reach a broader consumer base, becoming dependent on third-party distribution services. *Kangaeru-kai*, in contrast, established its own small distribution company and found ways to manage excess produce through processing. *Iga Yūki*, committed to democratic management principles within its producer group, strengthened collective practices by aggregating farmers' produce to meet diversified and larger scale demand.

In addition, the co-optation of concepts associated with the organic movement, such as *kao-no-mieru-kankei*, has made it challenging for the average consumer to distinguish organic *teikei* farmers from a variety of food localization initiatives and value-adding strategies with weaker environmental and social sustainability claims (Zollet, 2023). Divergent opinions among *teikei* members reflect the fact that the organic and *teikei* movements are at a crossroads, with some considering the growing popularity of concepts emerging from the *teikei* movement as positive, and others condemning the co-optation of their movement. This divergence often also reflects a generational gap as well, with younger farmers and consumers being more willing to accept new arrangements and compromises. It could be argued, however, that advocating primarily for personal lifestyle

⁴ “Citizen-consumers” and “citizen-producers” is not broadly used by *teikei* participants as the term citizen is related to different social movements such as *shimin-undo* (citizen movement). However, they do assert their commitment to sourcing food from trusted resources as part of a larger grass-roots movement. They embody civic-agriculture discourse, by taking an active role in shaping alternative food systems.

changes within closed networks of like-minded people has hindered the development and spread of *teikei* ideals and practices, especially in the face of neoliberalism-driven societal changes that have removed societal safety nets and made lifestyles more precarious. At the same time, the insularity of the *teikei* movement, its sometimes overly strict ideology, and its attempts to remain outside of the mainstream market have in some instances been detrimental, leading to a lack of generational renewal.

Teikei's historical distancing from political activism can also be seen as a "missed opportunity" within the movement to organize and institutionalize enough to be able to effectively lobby for better support toward sustainable farming, leaving the door open to a series of concepts, better supported through policy measures, that have diluted the organic movement's idea of agri-food system sustainability (Kimura and Nishiyama, 2008; Zollet, 2023). The recently approved (2021) Strategy for Sustainable Food Systems has similarly drawn criticism from the organic farming movement for its superficial understanding of organic farming and the *teikei* movement (Matsudaira, 2021; Taniguchi, 2022).

An open question arises about the extent to which values such as the ones promoted by the ten principles can accommodate more market-oriented arrangements. The boundary between cooptation of alternative models by the industrialized food system and adaptation to people's emerging needs—while still pursuing radical food system change—appears blurred and is continuously shifting. From this perspective, the concept of hybridity and hybrid food systems offers insights into the challenges of cooperating with mainstream actors while avoiding cooptation (Martens et al., 2022; Zollet, 2023). A connected and newly emerging aspect, especially post-COVID, is digitalization and the use of technology, especially in its role to facilitate consumer-producer exchanges (Lichten and Kondo, 2020). Although our studies did not specifically focus on its role within *teikei*, the convenience derived from technology often provides greater accessibility and flexibility. These characteristics might be desirable for traditional *teikei* groups to reach more consumers, even as the perception of technology—especially among older members—remains ambivalent. Intergenerational disagreements on how to adapt existing structures of operation remain a sticky point for several *teikei* groups, especially those still relying on paper order forms, which can deter new member recruitment.

The results of our analysis, however, also show the successes of *teikei* groups in perpetuating many of the ten principles. First, due in great part to the existence of *teikei*, which served as a blueprint for the development of the entire organic movement, Japan is still far from embracing the "corporate organic" model now predominant in other contexts (Johnston et al., 2009). The Japanese organic food sector remains, to a considerable extent, organized around *teikei*-like relationships, diversified agroecological farming and small-scale distribution (Zollet and Maharjan, 2020; McGreevy et al., 2021), and even *teikei* groups that have taken a corporate form, such as *Oisix-Ra-Daichi*, remain committed to core *teikei* values. In addition, the new generation of organic farmers continues to value small-scale food production, ecological integrity, and community engagement. This is true even for farmers who do not belong to *teikei* groups or explicitly identify with the *teikei* movement, which shows the continued influence of the movement's ideals. On the other hand, the use of the "*teikei* farm model" as a blueprint for organic farming in Japan has caused a relative uniformity in terms of organic farm management and production. Supporting a diversity of organic production models, while remaining committed to ideals of solidarity and

relationship-building, might help in addressing new needs both among farmers and consumers.

The persistence of solidarity practices between producers and consumers is also evident from the groups' focus on relationship-building and by the resilience of their decade-spanning networks (Norito, 2015). As noted by Kondo (2021), some *teikei* groups that were founded on non-capitalist ideals, such as the decommodification of food, have successfully adapted to younger generations. These younger members have found ways to sustain engagement with non-capitalist imaginaries through paid work on farms and shared conversation spaces to engage in further dialogue about food safety, food democracy, and food citizenship. For many of these members, the *teikei* space was not only an entry point to understanding the rationale behind alternative food networks, but also continues to be the only space where they can freely discuss their ongoing concerns about living in an industrialized global food system.

Finally, in a context such as Japan, where trust is derived from being part of social networks (Pekkanen, 2006), *teikei* groups and the ten principles have been fundamental to laying out the groundwork to develop and sustain social capital and facilitate relationship-building between producers and consumers. Linking trust to individuals being part of a network further emphasizes the importance of local groups in the creation of a more sustainable food system. The benefits arising from being part of a network with high degrees of social capital could serve as a glimmer of hope for the remaining *teikei* groups, especially as people increasingly reject consumerism and seek reconnection with others and with the land (Rosenberger, 2017; Kondo, 2021; Zollet and Maharjan, 2021a). The continued shared interest in building relationships and networks therefore may reflect a different kind of movement building, not expressed through direct political activism. Rather than choosing to protest the industrialized food system, current *teikei* practices focus more on the importance of the social connectedness and conviviality that comes from producing and sharing food, including through informal practices such as home-growing, bartering, and gifting (Orito, 2014). Research on contemporary Japan and similar post-growth country contexts also suggests a growing interest in rural living, food self-sufficiency and downshifted lifestyles among the younger generations, which include new approaches to viewing food production, for example as active prosumers (Osawa, 2014). These manifestations of "quiet sustainability" (Jehlička and Daněk, 2017) hold promise in changing food systems, at least at the local level.

At the same time, a renewed focus on collective action is necessary, as demonstrated by the growing engagement of international AFN literature with social movements and policy engagement (Andre et al., 2019; Zollet and Maharjan, 2021b). Some emerging examples in Japan include the development of municipal-level food policy councils and the development of organic school lunch programs. Both are promising entry points for policy and advocacy around agri-food system transformation, as these initiatives seek to work with municipal governments to institutionalize alternative food system approaches (Tsuru and Taniguchi, 2023). Such initiatives would also support more equitable access to organic food, especially for children. Finally, and perhaps more importantly, the divergent evolution and the fragmentation of *teikei* groups over time suggest the need for stronger and more active coordination among groups, in order to strengthen relationships among AFN advocates. This includes supporting organic farming at the territorial and level through community-level organic conversion and the clustering of new organic farmers (McGreevy et al., 2021; Zollet, 2024).

Conclusion

This paper has examined the evolution of *teikei* groups from the 1970s to the present day, analyzing their relational, operational, and ideological shifts in alignment with *teikei*'s foundational ten principles and shedding light on the lived experiences of *teikei* members. Exploring the historical arc of how farmers and eaters committed to democratic decision-making processes and how they actively shaped their alternative food system provides valuable insights in both the resilience, weakness, and adaptability of the *teikei* model. By delving into the nuanced changes made by *teikei* groups, we explored how the changes they made both diverge from, and strive to support, the essence of the ten principles set forth at the beginning of the movement amidst shifting socio-economic conditions in Japanese society.

This analysis directly responds to a call in AFN literature for contextualized research on the “emergence and consolidation of diverse alternative food initiatives, while being attentive to the contradictions that shape their project and how they seek to contest, challenge or even just modify what has become conventional” (Misleh, 2022, p. 14). Although we acknowledge that this study does not represent the entire *teikei* movement, it significantly deepens our understanding of the adaptations made by AFN actors in Japan, and at the same time underscores the need for further exploration, especially in more peripheral regions distant from urban centers.

It is evident that the operational dynamics of *teikei* groups today no longer perfectly align with the founding ten principles, yet the principles themselves remain relevant, as they offer a comprehensive roadmap for agri-food system transformation. The *teikei* principles act as a social contract reflecting a conceptualization of alternative producer-consumer relationships which strongly emphasizes the shared responsibilities of citizen-producers and citizen-consumers in bringing into existence a food system radically different from the conventional one. The operational, relational, and ideological shifts within *teikei* groups reflects an ongoing dialogue where participants actively negotiate their roles and participation.

Many *teikei* principles continue to outline viable practices of social learning and democratic management to build a food system based on solidarity between farmers and citizen-consumers. The continued relevance of *teikei* principles is also being validated by the direction of international AFN research and practice, which is focused on examining the possible contribution of AFNs to sustainability and community development from the perspective of alternative economic models (Blay-Palmer et al., 2016; Chiffolleau et al., 2019; Rosol, 2020; Misleh, 2022). *Teikei* history and the surviving *teikei* organizations can therefore serve as lighthouses for how AFNs can avoid being reduced to purely transactional networks and co-opted by mainstream food system actors. Furthermore, in today's socio-economic landscape marked by growing disillusionment with consumerism and a rising appetite for sustainability, interest in connecting with farmers and rural areas, as well as in participating in local food systems, these principles resonate across multiple debates outside the AFN literature as well (Kieninger et al., 2011; Chakroun, 2019; McGreevy et al., 2019; Manzenreiter et al., 2020).

The *teikei* movement serves not only as a historical case study but also as a dynamic and evolving experiment in food citizenship, including its complex or contradictory aspects. The democratic decision-making processes embedded within *teikei* principles offer a valuable model for understanding how individuals enact their citizenship and contribute to ongoing transformations of the agri-food

system. At the same time, however, they also offer a cautionary take about how democratic principles can be lost to conventionalization, and about the assumptions that go unchallenged in the process of building alternative agri-food systems, such as gendered labor. Although the *teikei* movement arose in response to mounting environmental crises and the industrialization of agriculture, its progression and development have led to a range of adaptations of the concept of food citizenship itself, and to the tailoring of *teikei* principles to suit consumer preferences and contemporary lifestyles. While there is a noticeable decline in the promotion of *teikei* as a social movement, there is a growing interest in a dynamic food citizenship that extends beyond mere market transactions. This new paradigm aims to foster deeper relationships between producers and consumers that embody principles of solidal and democratic management of food systems.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical approval was not required for the studies involving humans because the ethical approval was conducted through oral agreement with the interviewees. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and institutional requirements because in Japan, written informed consent is not required to conduct research.

Author contributions

CK: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. SZ: Conceptualization, Formal analysis, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing. MK: Writing – original draft, Writing – review & editing. NY: Writing – original draft, Writing – review & editing.

Funding

The author(s) declare financial support was received for the research, authorship, and/or publication of this article. The work was supported by Kakenhi Grant Number: 21K20068.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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RECEIVED 14 April 2023

ACCEPTED 10 May 2024

PUBLISHED 24 July 2024

CITATION

Middendorf M and Rommel M (2024)
Understanding the diversity of Community
Supported Agriculture: a transdisciplinary
framework with empirical evidence from
Germany.
Front. Sustain. Food Syst. 8:1205809.
doi: 10.3389/fsufs.2024.1205809

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Understanding the diversity of Community Supported Agriculture: a transdisciplinary framework with empirical evidence from Germany

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Introduction: Community Supported Agriculture (CSA) is an emerging model within alternative food networks (AFNs). It shapes close relationships between food producers and consumers, thereby contributing to food sovereignty and agri-food system transformations. Despite rapid growth from about 10 to over 500 CSAs in just over a decade, the model in Germany still remains niche. We argue that further and faster scaling up requires better understanding of its diversity, yet a comprehensive conceptualization of CSA types is lacking, with insufficient differentiation in research and practice.

Methods: This study employs a transdisciplinary mixed-methods approach (literature, qualitative, and quantitative data) in cooperation with the German CSA Network. By integrating organizational perspectives, we found that CSAs are highly complex and diverse organizations. Therefore, we firstly aimed at identifying characteristics that we summarized in a CSA framework. In a second stage, we used this framework as guiding structure for co-developing a survey with the Network covering 70 participating CSAs.

Results: As the defining characteristic within the CSA framework, community financing (domain A) clarifies the uniqueness of the CSA model, thus enables delimitation from other AFN forms. Then differentiation characteristics (domain B) encompass the diversity of CSA configurations. CSA governance (domain B1), regarding the predominant characteristic of organizational governance, distinguishes between Producer-led, Consumer-led, and Integrated (all-in-one) CSA types. Varying characteristics (domain B2) specify CSA configurations and enable additional distinction between CSAs. Based on the developed CSA framework, the survey results verify the applicability of governance types in particular, while confirming a high level of diversity of differentiating characteristics in general.

Discussion: This study can be used to reveal existing generalizations about CSAs, providing a starting point for more nuanced and critical views in research and practice. When seen against the background of AFN and food sovereignty discourses in particular, CSA is an alternative production-distribution model, but not every CSA is governed or structured in alternative ways. CSAs can simultaneously contain both more conventional, traditional elements, as well as more alternative elements. Moreover, the framework provides easy-to-access differentiation criteria for matching members with their most suitable CSAs and vice versa. Overall, this study illustrates that CSA cannot be considered as homogeneous AFN type but be rather marked as a diverse field of its own.

KEYWORDS

community supported agriculture (CSA), typology, CSA types, organizational governance, alternative food network, food sovereignty, transformation

1 Introduction

The current provision of food, systematically aligned with industrialization and growth, faces multiple interlinked crises such as climate change, environmental destruction, social inequalities, and threats to democracy around the world (e.g., Battilana et al., 2022; Mirzabaev et al., 2023). Against this backdrop, both socially and ecologically-sustainable food systems are being called for (e.g., Hinrichs, 2000; Mars, 2015; Campbell et al., 2017). Under the umbrella term Alternative Food Networks (AFNs), a diversity of approaches and involved actors are subsumed, whereby Community Supported Agriculture (CSA) is widely mentioned as an impactful model within the AFN movement (e.g., Mount et al., 2013; Chiffolleau et al., 2019; Ribeiro et al., 2021). The CSA model is described briefly as being a partnership between producers and a community of members which cover the cost of production of the farm, wherein the members receive a food share of the harvest throughout the season in return (Parot et al., 2023). According to this, the CSA model aims to “reshape dominant capitalist producer-consumer relations” (Plank et al., 2020, 51) and is ascribed as having significant potential in achieving food sovereignty, and also in contributing to the sustainable transformation of agri-food systems (e.g., McMichael, 2014; Galt et al., 2019; Plank et al., 2020).

Although various conceptions of CSAs have evolved internationally, given geographical and historical contexts (e.g., Whatmore et al., 2003; Goodman, 2004; Watts et al., 2005; Bashford et al., 2013; Si et al., 2015), most studies that consider CSAs as a homogenous phenomenon among others in AFN typologies tend to lump together different organizations that are using the CSA model (e.g., Si et al., 2015; Ribeiro et al., 2021). For instance, CSAs are often described in a generalized way as collectively managed by a community, although in practice CSAs are very often organized just by single farmers or farming families, that do not involve their members in decision-making processes (e.g., Adam, 2006; Bashford et al., 2013; European CSA Research Group, 2016; Hvitsand, 2016; Espelt, 2020; Plank et al., 2020; Grenzdörffer et al., 2022). It is therefore essential to define some terms related to the CSA terminology in this paper: (i) “CSA model” refers to a specific AFN form; (ii) “CSA organization” (hereinafter abbreviated as “CSA”) relates to the entire organization of producers and members; (iii) “CSA farm” is an agricultural or horticultural farm that operates using the CSA model. These distinctions are essential, as among other things, several CSA farms can establish partnerships with other CSA farms to form so-called “multi-farm CSAs”¹ (e.g., Adam, 2006; Woods et al., 2017).

Due to the generalizations mentioned, studies often make neither sufficient distinctions between different CSA configurations nor state the multifarious effects or individual challenges they have [see Galt et al. (2019) for United States, Dong et al. (2019) for China]. For instance, good labor and

employment practices may not be employed by each CSA, as there have been incidents of (self-) exploitation of producers (e.g., Hinrichs, 2000; Carlson and Bitsch, 2019; Galt et al., 2019; Ajates, 2020; Böhm et al. 2020; van Oers et al., 2023). This can be explained by the fact that CSAs are strongly embedded within their environments and socio-ecological and economic systems (Muñoz and Cohen, 2017). Another example is that, depending on the individual CSA configuration, they may often have different degrees of participation and may struggle with a lack of participation by its members or inadequately integrate low-income individuals (e.g., Pole and Gray, 2013; Watson, 2020; Pitts et al., 2022). In strong contrast to the mentioned generalizations and studies that lump CSAs together, some scholars do highlight that not all CSAs are the same and can take a wide diversity of organizational forms “as farmers and members shape it to their own needs and expectations” (Samoggia et al., 2019, 1). Yet, even though some studies see CSA as a highly complex, diverse, and multi-faceted phenomenon (e.g., Blätzel-Mink et al., 2017; Baronov, 2018) with diverse configurations (e.g., Carlson and Bitsch, 2019; Espelt, 2020; Koretskaya and Feola, 2020) an overarching conceptualization of the diversity of CSAs is missing. One explanation for this could be that existing research on the CSA model is concentrated on the membership perspective, such as the motives of consumers for joining and participating in CSAs (e.g., Feagan and Henderson, 2009; Pole and Kumar, 2015; Blätzel-Mink et al., 2017; Zoll et al., 2018; Gruber, 2020; Fomina et al., 2022). While this research and existing typologies offer valuable insights, they are limited in terms of research perspective and scientific disciplines, often sidelining the crucial viewpoint of CSAs as diverse organizations. This has meant there is a paucity of organizational perspectives in the CSA discourse. It is therefore helpful to adopt King et al.’s (2010) suggestion that organizational perspectives should focus on the unique features and practices of organizations. Accordingly, CSAs can be considered as complex arrangements wherein organizational perspectives are considered and combined in formal structures (e.g., as a legal entity) with various forms of organizational governance, as well as property and decision rights. Examples of these characteristics include different forms of contracts, coordination mechanisms, and the (non-) formalization of decision-making (see Ménard, 2013). A focus on the CSA organization itself through the inclusion of organizational perspectives also has the potential to address challenges of CSAs, again depending on their respective configuration.

For a better understanding of the diverse configurations of CSAs, the first aim of this paper is the development of a differentiating framework. The second aim is to use and apply the framework to show the diversity of CSAs in Germany. This study is based on a mixed method approach including literature, qualitative, and quantitative data and is conducted in a transdisciplinary research partnership based on knowledge

¹ For details, see framework characteristic “single / multi-farm” in chapter 3.1.

co-production with the German CSA Network and its actors. The specific two research questions that guided our research are:

- 1 According to which characteristics discussed in literature and practice can CSAs be differentiated?
- 2 How is the diversity of CSAs manifested in Germany?

To answer these questions, we first introduce the research methodology and design of this mixed-methods study (chapter 2). Accordingly, we present our results (chapter 3) and discuss the potential and limitations, as well as the implications of our framework for practice and future research (chapter 4). A conclusion summarizes all results of our paper (chapter 5).

2 Methodology and transdisciplinary mixed-methods research design

This study was conducted by a transdisciplinary research partnership based on knowledge co-production (Jahn, et al., 2012; Lang et al., 2012; Weber et al., 2014; Schuttenberg and Guth, 2015; Schöpke et al., 2018; Hilger et al., 2021) with the German CSA Network² between January 2020 and December 2023, and was embedded in the research projects “nascent” and “SolaRegio.”³ We first describe this transdisciplinary research partnership (chapter 2.1), and then describe the used data material within the two-stage-process of knowledge co-production that contains the development of the CSA framework as well as the survey (chapter 2.2).

2.1 Research partnership with the German CSA Network

Knowledge co-production is defined as “an inclusive, iterative approach to creating new information; [...] distinguished by its focus on facilitating interactions between stakeholders to develop an integrated or transformational understanding of a sustainability problem” (Schuttenberg and Guth, 2015, 1). Transparent research therefore requires awareness of the different roles combined with overcoming the researcher-practitioner dichotomy in the collaboration between researchers and non-scientific actors (see Hilger et al., 2021). As researchers with different disciplinary backgrounds, including alternative and critical organization, as well as social and sustainability science and sustainability economics perspectives, we combine research areas and are able to move across different fields and disciplines. The authors’ preliminary work in the field being studied build necessary trust with the Network and eased the entry of the object of study. Involved actors in this study are people working and engaged in the Network, for instance, experts from their internal working groups (e.g., “Research,” “Consulting,” “Cooperatives”), practitioners such as individual CSAs, and various participants in events, workshops, and meetings of the Network. In this sense, the Network cannot be classified exclusively as a non-scientific actor. More specifically, a particular “Research Working Group” bundles and coordinates research and scientific work around the topic of CSA, collects practice-relevant

questions, tries to avoid duplicate surveys, and is involved in several research projects. By being actively involved in such collaborative processes, research can be managed in order to meet the needs of the CSAs. The Network has formulated, for example, research ethics recommendations for good cooperation (German CSA Network, n.d.) that the authors of this study followed.

2.2 Two-stage knowledge co-production process and used data material

To answer the two research questions, the entangled nature of the used transdisciplinary mixed-methods design (Creswell and Plano Clark, 2018) unfolds in this study by combining three different data materials (literature research, qualitative data and quantitative survey, displayed in Table 1).

The knowledge co-production is divided into two stages. Stage I is the parallel development of the CSA framework and the survey using an iterative approach. Stage II is the framework application and survey conduction.

2.2.1 Stage (I) iterative development of framework and survey

The first stage is divided into the framework development (stage Ia) and the parallel survey development (stage Ib). The whole development of this paper is embedded in the process of planning, conducting, and then analyzing an extensive quantitative survey in 2022 as a joint project between research⁴ and the Network. The survey development is therefore connected to the parallel framework development. For this development process, an iterative approach is applied which involves numerous steps through analyzing CSA literature (literature research) and by including discussions with the Network and its actors (qualitative research). These steps are described in the following in a chronological order.

This study was initiated by both a focus group meeting between the Network and researchers as well as a participatory observation at a Network’s one-day conference (qualitative research). Both took place in January 2020 in order to specify research demands (for a chronological list of used qualitative data material and question categories, see Supplementary material). After this first step, we inaugurated a sample of CSA literature ($n = 35$ publications) to identify characteristics and types from the current discourse (literature research). Due to terminological heterogeneity, as well as the fact that characteristics for differentiation and CSA types are often only a by-product and are not explicitly mentioned in titles, abstracts, or keywords, we took an exploratory approach. For this, we started with recently published peer-reviewed articles from 2019 and 2020 to look at the current research discourse. We identified literature with the keyword “Community Supported Agriculture*” used to search the online catalog Web of Science (WoS) database. Furthermore, we added frequently cited scientific literature, as well as suitable articles based on our own knowledge. This included, for example, key publications by or in collaboration with CSA Network associations from different countries and the international CSA

² Hereinafter abbreviated as “Network.”

³ Website of “nascent” and “SolaRegio”: www.nascent-transformativ.de

⁴ Besides the authors, Laura Carlson was involved.

TABLE 1 Combination of three different data materials during the two-stage knowledge co-production process (own illustration).

Type of data	Method	Data source	Sample size
Literature	Literature research	Scientific and gray literature	$n = 60$
Qualitative	Focus groups and Interviews	Researchers, experts, consultants, practitioners	4 focus groups with overall 25 participants; 6 interviews with 5 participants overall; Various feedback loops/discussions with 16 participants overall
	Participant observations	Non-scientific conferences with CSA experts, consultants, practitioners, policymakers, researchers	10 non-scientific conferences
Quantitative	Survey	Member-CSAs and CSA farms of the German CSA Network	$n = 70$ CSAs with 81 CSA farms

Network association, URGENCI. This starting literature sample intentionally included gray literature (e.g., not peer-reviewed book chapters, project reports, in-house publications of institutions and Networks) as they were cited several times in the identified peer-reviewed articles and often served as the starting points for these publications.

In the next step, we analyzed this literature sample with regard to their extent characteristics and types. We extracted the designations and terminologies of identified characteristics and types (e.g., forms, models, schemes), and, if available, also the descriptions, definitions, and distinguishing criteria (literature research). As part of the iterative approach, we discussed first drafts of identified characteristics and types with the Network and its actors (qualitative research). To include their practice-based knowledge, we conducted in total four focus groups with 25 participants overall, six individual interviews, and used participant observations (Kawulich, 2005) at 10 non-scientific Network conferences (e.g., biannual meetings of the Network). In addition, various discussions with 16 participants in total also comprise part of this iterative approach (for data details see Table 1 above). In doing so, we used audio recordings, as well as research diaries, and MAXQDA-Software for transcription, data management, and analysis. Many events and interviews were conducted online due to COVID-19 restrictions. The involved actors in qualitative data collection included people working and engaged in the Network as well as CSAs (see chapter 2.1). Furthermore, several persons of the Network brought in their knowledge and contacts as field experts and participated, partly with other researchers.

As part of the iterative approach, we discussed the prototypes of the framework and the survey as interim results several times with actors of the Network (qualitative research) leading to recommendations for additional characteristics as well as the modification of existing ones.

In the next step, we actively searched for these identified aspects in the literature sample. Wherever necessary, we also expanded the sample (literature research). To carry out the literature research, we followed a simplified snowball approach (Wohlin, 2014) including suitable articles. Our research for the framework development snowballed until saturation occurred so that no other or new CSA characteristic or type could be named or differentiated. Using this literature identification process, a further 25 publications were identified. In sum, 60 publications made up the final literature research data sample and were used for the iterative development of the final framework and final survey.

Regarding research question 1, we identify various characteristics for differentiation of CSAs in stage (Ia) (chapter 3.1). We provide therein a CSA definition of this study in the German context with the *defining characteristic* of the CSA model, which is *community financing* (framework domain A). We identified various *differentiation characteristics* (domain B), whereby organizational governance has been identified as the predominant one. This predominant nature of CSA *governance* (domain B1) could be confirmed by both literature and practitioners. According to this, we provide a CSA governance typology based on three CSA *governance types*. In accordance with Doty and Glick (1994), typologies provide a reduction in complexity by providing a set of identified types. In this context, we considered organizational governance literature. During the iterative development of the framework, we identify further *varying characteristics* (domain B2) that express even greater diversity of CSAs within these characteristics. The result of the final CSA framework is visualized in chapter 3.4.

2.2.2 Stage (II) framework application and survey conduction

In the second stage of this study, regarding research question 2, the finalized survey was conducted between the end of 2021 and the end of 2023. The survey is designed as an internal database of the Network, aimed at providing well-founded data over time. The Network intends to update the data at regular intervals (for details see Supplementary material). The survey follows a discursive methodological approach in which, for example, the CSAs were asked to assign themselves according to specific characteristics. The survey and the data collection process itself (e.g., invitation, mailing) was coordinated by the Network. The technical implementation was carried out by their "IT Working Group." At the time the survey was sent out, there were about 400 CSAs in Germany. As defined in the introduction, a distinction can be made between the entire CSA organization and the individual CSA farms (see chapter 1 and characteristic *Single/Multi-farm* in chapter 3.1). Consequently, some questions are answered at the level of the CSA organization and others at the level of the individual CSA farm. The Network contacted all CSAs who were official members within their association at that time (in total 164 CSA farms) via email and newsletter and send out several reminders. The survey was open to respondents from November 2021. This paper considers all records up to and including December 18, 2023. Until this date, a total of 81 out of 164 CSA farms (51% of the Network members at that time) responded to the questionnaire and generated quantitative results on

CSA in Germany (chapter 3.5). In total, 81 farms that are part of 70 CSA organizations responded to the survey. However, each question (relating to a specific framework characteristic) had a different respondent rate (i.e., not all participants answered every single question of the survey).

2.2.3 Visualization of the knowledge co-production process and used data material

Regarding the visualization of Figure 1, the methods and used data material are illustrated in blue (literature research, qualitative data, quantitative survey conduction). For details see Table 1). The interim results (prototypes and final survey) are presented in light green, and of the final results (CSA framework, quantitative survey results) in dark green.

3 Findings

This section is divided into two subchapters. Firstly, the framework development (chapter 3.1), and secondly, its application to the field of investigation in Germany using the survey (chapter 3.5).

3.1 CSA framework

Elaborating from research question 1, the characteristics of the CSA framework are explained in detail along two intertwined domains which build on each other. These domains relate to (A) *defining characteristic*, that can be found in every single CSA, and then (B) *differentiation characteristics*, that delineate the diversity of CSAs. Domain (A) *community financing* is the central *defining characteristic* and is mandatory to be considered a CSA. In this sense, domain (A) is mandatory, clarifies the uniqueness of the CSA model, and delimits it from other AFN forms. After this clarification and delimitation, then domain (B) encompasses the diversity of CSA

configurations through *differentiation characteristics*. These characteristics can vary from one CSA to another. The key distinction lies in the mandatory presence of domain (A) for all CSAs, whereas domain (B) varies depending on the individual CSA configuration.

More specifically, *differentiation characteristics* (domain B) comprise two sub-domains. The individual configuration of CSAs depends upon the respective organizational governance as the CSA model can change the way organizations are governed. Domain (B1) proposes three *CSA governance types* as a *predominant characteristic* to differentiate CSAs as their governance approaches vary. Domain (B1) is intertwined with domain (A) since *CSA governance* specifies the how of *community financing* through a particular type of governance. These types can be specified by further *varying characteristics* (domain B2) to express even greater diversity of CSAs, and which enable an individual CSA configuration within these characteristics depending on the governance type.

The domains are intertwined as they build on each other. *Differentiation characteristics* (domain B) shed further light on the distinct expression of *community financing* (domain A), while *varying characteristics* (domain B2) specify CSA configurations, whereby the configuration depends on the respective *CSA governance type* (domain B1). In the following all domains are outlined in detail, summarized at the end, by the introduction of the framework-visualization (see chapter 3.4).

3.1.1 Framework domain A: defining characteristic community financing

We define the CSA model as a system of risk sharing and transparent co-financing by membership fees of the entire CSA operations in exchange for a food share for the CSA members. Thus, we wrap the uniqueness of the CSA model into the characteristic *community financing* which is mandatory to be considered a CSA (framework domain A). This *defining characteristic* is based on fee financing, cost coverage/full financing, risk sharing, transparency, and

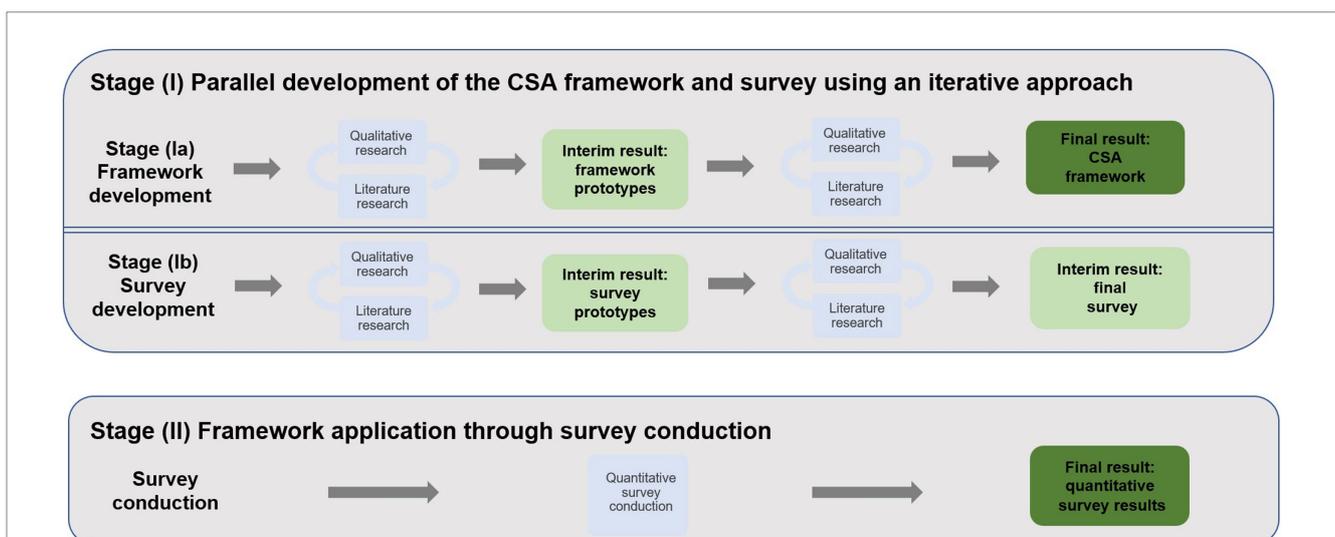


FIGURE 1 Two-stage knowledge co-production and used data material: (Stage I) Parallel development of the CSA framework (Stage Ia) and the survey (Stage Ib) using an iterative approach; (Stage II) Framework application and survey conduction (own illustration).

direct relations which can be shaped in different ways by CSAs (see description of the elements and their diversity in Table 2). *Community financing* describes the collaborative investment of the farm's operating costs that comprise fee financing, true cost coverage of the production, risk sharing, transparency, and direct relations between the food production and consumption side (e.g., Groh and McFadden, 2000; Ostrom, 2007; Cox et al., 2008; Bloemmen et al., 2015; Carlson and Bitsch, 2019; Fomina et al., 2022; Rommel et al., 2022). Consumers jointly become members of a CSA and help cover the farm's total budget over a particular growing season. This will have been done through regular, usually monthly, contributions (e.g., Haney et al., 2015; Galt et al., 2019). The members share the risks and benefits associated with weather dependent and seasonal farming and in return receive a proportional harvest share, typically on a weekly basis (e.g., O'Hara and Stagl, 2001; Brehm and Eisenhauer, 2008; Opitz et al., 2019).

3.1.2 Framework domain B: differentiation characteristics

The diversity of CSA becomes visible through *differentiation characteristics* (domain B). Literature research as well as our empirical results attribute *CSA governance* a *predominant characteristic* as the other *varying characteristics* are often shaped and formed according to it. On this basis, three different *CSA governance types* can be distinguished (domain B1), whereby organizational governance affects and interacts with the *varying characteristics* (domain B2).

3.2 Domain B1: CSA governance as predominant characteristic

The aspect of how and by whom an individual CSA is governed, organized, and managed is ascribed a central and predominant characteristic in CSA and AFNs literature and by CSA practice (e.g., Krcilkova et al., 2019; Rosol and Barbosa, 2021; see also examples below). A CSA can be managed by an individual or a core group,

which ranges between being solely led by the producer (i.e., single farm or farmer) to being led by a community with a corresponding decision-making process taking on most managerial responsibilities. The focus of this characteristic lies in the responsibility for higher level "management decisions" (Adam, 2006, 2), particularly the managerial "ownership of the operation" (Harmon, 2014, 2), which addresses who organizes and operates the CSA and who "makes most of the management decisions" (Adam, 2006, 2). An example from the CSA literature is the managerial decisions by the directors or growers that run the CSA. Mert-Cakal and Miele (2020, 11) distinguish between lower and higher decision-making levels, whereby the core question being addressed is, "Who makes the [(managerial)] "decisions" in CSA organizations?" The predominant characteristic of governance is also consistent with organizational governance literature. To understand the organization requires knowledge of its governance concerning direction and control (Cadbury, 1992). Organizational governance includes how decision-making processes and thus the distribution of power between the involved actors (e.g., managers, shareholders, employees, volunteers etc.) is attributed. Establishing and running an organization in general requires defined rules about who is in charge, who is involved in taking vital decisions, how potential profits are distributed, and who bears risk. Establishing the rules that shape organizational action creates the governance structure of an organization (e.g., Cadbury 1992; Klein et al., 2019). Thereby, governance is not static but also evolves from social norms and beliefs (Wiersema and Koo, 2022), which is why different governance types exist.

By reviewing the CSA literature, various typologies and a diversity of type-terminologies can be identified (for details, see Supplementary Table S5). What these identified typologies have in common is that they are neither literature- or theory-based, described in their development, defined in detail by CSA actors, nor differentiated in empirical studies. For example, the often cited report by Wilkinson (2001) uses a classification based on who organizes a CSA. The only sizable two-sided practical report distinguishes between four types: farmer managed, shareholder/subscriber, farmer

TABLE 2 Community financing as defining characteristic of the CSA model and its elements (own illustration).

Elements of community financing	Description of the community financing elements
Fee financing	Collaborative financing via fees by the individual CSA members (membership fees) which is financing the entire CSA operations for an annual membership (often for one particular growing season). In return, the members receive a proportional food/harvest share, typically on a weekly basis. Some CSAs take a break in winter or only provide a food share every 2 weeks. Members often pay the fees for their food/harvest shares monthly, although there are also annual advance payments.
Cost coverage / Full financing	Consumers who become members of a CSA, jointly cover the CSA budget of a particular growing season through regular, usually monthly, contributions. The membership fees cover all costs (full financing) of the CSA operations. This requires a cost calculation in advance by the CSA. The goal is to cover the true costs of production that includes the entire CSA operations.
Risk sharing	The members share via their membership fees the risks and benefits of the CSA operation with the food producers by adjusting their consumption to the farm produce available. The food/harvest share may be subject to seasonal and weather-related fluctuations (i.e., crop failures).
Transparency	CSA makes the cost structure and annual budget (costs of agricultural production, including wages, investments and savings), production standards and cultivation methods, as well as (if exists) the bidding rounds transparent for members.
Direct relations	Members receive the food/harvest share directly from the CSA farm(s). Direct connection between the food producers (those who grow food/work at the CSA) and the members (those who receive the food) without intermediaries, wholesalers or retailers in between. The model, therefore, seeks to reshape the nature of buying and selling agricultural goods.

cooperative and farmer-shareholder cooperative. Here, the type “farmer cooperative” correlates, for instance, with another differentiation characteristic which is multi-farm CSA (see below). In contrast, the often cited peer-reviewed case study by Ostrom (2007) summarized the management strategies of CSAs into three types: farmer-founded-and-driven-CSAs, CSAs initiated as a non-profit with a board of directors and supported by community financing, and a business-oriented and farmer-directed entrepreneurial approach, however, different characteristics, such as governance, management, foundation background, legal form and/or labor, are included and mixed together in these type-terminologies. Another example cited is the four distinct approaches to CSA by the CSA Network in the United Kingdom (UK) cited by Espelt (2020): producer-led, consumer-led, producer-community partnerships, and community-owned farms (see CSA Network UK, 2022). Even in this typology, there is no clearly recognizable distinguishing criterion. Governance, management, founding background, ownership and legal forms, as well as the aspect of labor, blur and partly overlap making difficult a clear distinguishing between the UK “consumer-led type” and “community-owned farm type.”

Our literature research as well as qualitative data that take into account insights of key CSA-experts in Germany shows that it could be helpful to subsume CSAs into CSA governance types by asking how or by whom the CSA is governed (Krcilkova et al., 2019), (*self-*) *organized* (Bashford et al., 2013; Zoll et al., 2018 Opitz et al., 2019), *driven* (Adam, 2006; Bashford et al., 2013; European CSA Research Group, 2016; Hvitsand, 2016; Tang et al., 2019), *led* (European CSA Research Group, 2016; Espelt, 2020; Mert-Cakal and Miele, 2020), *run by* (Ostrom, 2007; Feagan and Henderson, 2009; Bashford et al., 2013; Hvitsand, 2016; Espelt, 2020; Mert-Cakal and Miele, 2020; Plank et al., 2020), *operated by* Adam (2006), Bashford et al. (2013), Ouahab and Maclouf (2019), and Koretskaya and Feola (2020), or (*self-*) *managed* (Wilkinson, 2001; Ostrom, 2007; European CSA Research Group, 2016; Krcilkova et al., 2019; Espelt, 2020; Mert-Cakal and Miele, 2020; Plank et al., 2020). The examples cited show that the aspect of governance is often used. As we have shown, no common use of terms satisfactorily distinguishes the identified various CSA types, used

descriptions and terminologies. Using the predominant characteristic of organizational governance, three CSA *governance types* can be distinguished by asking how or by whom the CSA is governed: Producer-led CSA (Type 1), Consumer-led CSA (Type 2), Integrated (all-in-one) CSA (Type 3). For definitions, see Table 3.

According to a consultant from the German Network, the differentiation into these three CSA governance types within the framework is useful and has potential to remove uncertainty: In the same sense the consultant points out: “In the past I saw only two types, namely the producer-led CSAs [(type 1)] and the others. But especially in the development of the last years, I actually see type 2 and type 3 as independent groups.”

3.3 Domain B2: varying characteristics

The individual configuration of CSAs depends upon the respective organizational governance. The CSA *governance types* unfold their specific nature through the interplay between various additional characteristics. These further *varying characteristics* express even greater diversity of CSAs within these characteristics and are presented in the following. The characteristics are summarized in the framework-visualization in chapter 3.4 (see also Supplementary Table S6).

Degree of co-decision by members/workers: It relates to both *workers* and/or *members* in terms of their integration within decision-making processes. Besides multifarious existing methods and approaches toward co-decision-making, it varies considerably in a spectrum from relatively low to medium to high (e.g., Koretskaya and Feola, 2020; Mert-Cakal and Miele, 2020). The lower level includes, for example, online polls or annual shareholder meeting. Daily decision-making belongs to the producers or a core group, whereby members have only informal participation. The medium level includes, for example, majority member decisions-making during the year in addition to the shareholder meeting or working groups possibly with voting rights. The higher level of co-decisions-making includes members’ participation that is done, for example, by voting at the annual general meeting of the CSA (e.g., basic democratic

TABLE 3 CSA governance types (own illustration).

CSA governance type	Description of the CSA governance type
Producer-led CSA (Type 1)	The farm, farmer or farmers decide alone whether, how, and for how long the farm operation will be managed along the CSA model. The production of agricultural goods is carried out by one or several independent farm/farmer/farmers, whereby co-workers and volunteers can also be employed. The agricultural and/or horticultural farm is supported by consumers that are a format/informal community of members. Although the members have different opportunities to participate, most of the management decisions remain with the producer(s).
Consumer-led CSA (Type 2)	A group of consumers build a formal and legal organization (e.g., an association). This community organization has paid staff or is managed by volunteers. The production is carried out in a partnership with one or several existing partner farm/farmer/farmers, whereas the CSA organization is managed and led by the group of consumers. They decide with which farm(s) they want to partner. This also includes the aspect of whether the duration of the cooperation is to be continued after the end of the agreement, or whether a new farm/farmer/farmers are to be selected as partners for the CSA model. Likewise, the farm/farmer/farmers can also terminate the cooperation.
Integrated (all-in-one) CSA (Type 3)	People create a CSA organization as single legal entity which integrates and carries out (all-in-one) the production, management, administration, and ownership of the entire CSA farm. People are hired to manage, organize, farm and cultivate. All production and CSA-management related decisions are made by a board or delegated by general assemblies with workers and members. Type 3 differs from Types 1 and 2 (each with a partnership between producer and consumers - or vice versa) by its integrated approach as one organization.

decision-making structures, sociocratic form of organization, consensus, or consent decisions).

Founding impulse: Several studies differentiate CSAs by asking by whom the CSA was founded (e.g., Ostrom, 2007; Hvitsand, 2016; Carlson and Bitsch, 2019). recognized that every CSA is organized uniquely based on its history, geographical, and founding context. For example, Carlson and Bitsch (2019) do not distinguish between different CSA governance types, but on whether it was initiated and founded by producers (farmers) or consumers. Existing farms may be owned by farmers who are searching for a community in order to become CSA members, or a core community group may look out for one or several farms with which to cooperate and establish a new CSA model (see also *single or multi-farm* characteristic below). Another possibility is that a community may establish its own CSA which will include its own farm (Bashford et al., 2013). A combination of both, farm/farmers and consumers, is another possibility. In addition to this, researchers name a third-party founding impulse, such as a government or a restaurant [see Chinese CSA study by Tang et al. (2019)]. Vlasov et al. (2021) show that CSAs can be founded by people with non-agrarian backgrounds.

Establishing paths: There are several paths toward establishing a CSA. One path is a full or partial conversion of an existing agricultural farm to the CSA model (see also characteristic *scope of CSA operation*). In addition, a CSA can be founded by establishing a new agricultural start-up. Other establishing paths include the handover of an existing CSA, for example as part of a generational succession process (e.g., inheritance) as well as a spin-off from an existing CSA (e.g., Bashford et al., 2013; Carlson and Bitsch, 2019).

Legal form: CSAs are designed in a wide spectrum between individual and independent privately-run farms where the business is under sole proprietorship, to non-profit forms like a association, or CSAs legally registered as a cooperative. Others exist in mixed forms, such as the combination of non-profit and for-profit legal forms. Examples are non-profit associations registered as clubs and non-profit organizations organized as cooperatives where only the workers are stockholders (e.g., Cameron and Wright, 2014; Bloemmen et al., 2015; Carlson and Bitsch, 2019).

Ownership and property for land / operation: Some CSAs are existing farms that are owned by the producer or more precisely by the farmer(s) (Bashford et al., 2013). The commonly-known subscription CSA is initiated by the farmer, who maintains ownership of the operation (Harmon, 2014; Espelt, 2020). Other producer-led types may be joint owned by a couple of growers (Mert-Cakal and Miele, 2020), wherein both examples can lead to CSA governance type 1. Another possibility is that CSAs are “jointly owned by both producer and consumer members” (Bashford et al., 2013, 21) or even people starting a new CSA in the form of a legal cooperative, whereby the community of members owns the farm (Espelt, 2020) (can lead to type 3). *Ownership and property* are mentioned as important, but are rarely empirically investigated in CSA studies (e.g., Mert-Cakal and Miele, 2020). Few researchers, such as Koretskaya and Feola (2020, 306), ask questions like, “How is access to property structured?.” *Ownership and property* is predominantly discussed with a focus on land or other resources, which are owned, rented or (temporarily) occupied by CSAs (European CSA Research Group, 2016). Thus, it seems important to also consider the ownership and property structure of the CSA itself. In the literature, it is touched upon in only a few cases and named as “collective property” (European CSA Research Group, 2016, 77), “shared ownership”

(Bashford et al., 2013, 21), “co-operatively owned” and “non-farm owned” (Woods et al., 2017, 4) initiatives, where almost no distinction is made between land and CSA operation.

Labor and work: This characteristic includes diverse forms from paid to voluntary labor, full- or part-time work, as well as seasonal employment contracts, also including aspects of fair working conditions. Due to labor-intensive agricultural production, such as with vegetables, most CSAs have different forms of work. Examples are the individual self-employed farmer or gardener as well as employed or volunteer family members. Other CSAs hired full-time additional workers, seasonally or on an hourly basis. CSAs can also have trainees, interns or unpaid volunteers (e.g., Harmon, 2014; European CSA Research Group, 2016; Carlson and Bitsch, 2019; Krcilkova et al., 2019; Espelt, 2020; Koretskaya and Feola, 2020; Watson, 2020). Labor and work can be differentiated by quantification. For example, in relation to the number of workers (full-time and part-time) and the number of seasonal workers. A further differentiation can be made if CSA members work as volunteers in the CSA. Thus, the co-production by the CSA members can be of differing degrees: voluntary or mandatory, unpaid, serving as a discount on the share, or a paid position. Some CSAs limit the mandatory labor of their members to the main summer harvest season in order to provide support for peak workloads, such as during vegetable harvests, and by organizing ‘working party days’ (Watson, 2020). Other CSAs offer work-share memberships for its members. In this case, members can do work shifts to pay less for a share. Members can work a certain number of hours per week, month or season in the CSA (e.g., planting, harvest, sorting, and cleaning from the harvest, packing shares, or share distribution) and receive in return a partial or full discount on the share price (Cone and Kakaliouras, 1995; Goland, 2002; Cox et al., 2008; Shi et al., 2011; Watson, 2020).⁵ There are also CSAs that limit volunteering by members to only a few work activities per year, since instructing and teaching new members in rotation is a time-consuming process for the employed team.

Farming method: Various methods can be identified depending on the country and are either conventional (not organic), organic (not certified) or organic (certified). The CSA movement is often closely linked to organic farming practices as the majority of CSAs seem to be certified organic or at least use organic practices without official certification (e.g., Bashford et al., 2013, European CSA Research Group, 2016; Carlson and Bitsch, 2019). In some regions, there are also Participatory Guarantee Systems (PGS) or third party (organic) certifications with more adaptive possibilities as specified by the CSAs (European CSA Research Group, 2016). Reasons not to seek official certification include a lack of credibility of the certification [for China, see Tang et al. (2019)], financial reasons due to the cost of certification, or the sufficiency of trust between producers and members that make certification unnecessary for some CSAs.

Single or multi-farm: CSAs can be established as a single farm CSA or in a partnership with multiple farms (e.g., Adam, 2006; Woods et al., 2017). In the latter, two or more producers cooperate in a formal partnership with each other and with one group of members. Through this cooperation, the CSA is able to offer a greater variety of products

⁵ In literature, there are also examples of members harvesting their own vegetables (Chen, 2013; Koretskaya and Feola, 2020). In these cases, however, we speak of self-harvesting projects.

and allow the specialization of individual farms, for example, in vegetable and fruit cultivation or in arable farming (Bashford et al., 2013). This CSA could then provide full supply cooperation for a broad range of food products (European CSA Research Group, 2016). The multi-farm approach can also permit risk sharing between involved farms (European CSA Research Group, 2016). Aside from this close formal partnership, more informal co-operations also exist. These benefits described are reduced competition between CSAs in the same region, which mean the “benefits could also include sharing marketing efforts, customer and delivery logistics, and the use of farm equipment” (Galt et al., 2019, 18).

Product variety: This relates to products offered by the CSA, ranging from CSAs which exclusively provide vegetables and fruit (Blätzel-Mink et al., 2017), to full supply CSAs that integrate processed food, such as milk, yogurt, meat, bread, etc. Some CSAs offer animal products only as an additional option for their members (e.g., Bashford et al., 2013; European CSA Research Group, 2016).

Degree of self-production: The food share may not include goods produced only by the CSA farms but may also be enhanced by external purchases. Additional purchases can be market-based, based on cooperative structures such as binding contracts, or even be organized as a community-supported cooperation with corresponding risk sharing in which external farms are not paid for a guaranteed amount of products but for the farming of a specific and fixed cultivation area (Rommel et al., 2022). The respective degree (e.g., own production, additional purchases with or without risk sharing, market-based purchase) can be indicated as a percentage and thus made more transparent.

Share distribution channels: The food share can be carried out and organized by the individual farmer, the CSA organization, or the members themselves. Home delivery, self pick-up by the members from the farm or at collection points (so-called depots) are share distribution channels according to which CSAs can be differentiated. Such depots are often established in cooperation with the members in their neighborhoods at restaurants, cafés, schools, workplaces, markets or in basements and garages of private households. This depends on the possibilities, the composition of the share (for example, because of perishable products and the necessity of cold chain logistics), and the creativity of the members. In addition, self-harvesting, although rare, is sometimes available, or can be provided in a supportive way as the need arises. If multiple CSAs are in the same region, they sometimes collaborate in the packing, grading, storing, cooling, and delivery with other CSAs, as well as AFN initiatives such as food hub concepts or food co-ops. Such cooperation in logistics or in operating a depot help in the sharing of infrastructure resources and thereby reduce costs (e.g., European CSA Research Group, 2016; Woods et al., 2017; Zoll et al., 2021).

Share distribution area: CSA members are more likely to be in urban, suburban, or peri-urban settings and tend to be rather educated, middle-class people who know about the concept and can afford the financial contributions as well as the additional effort required to engage, organize pick-ups, cook etc. (e.g., Goland, 2002; Bloemmen et al., 2015; Plank et al., 2020; Si et al., 2020). In contrast, CSA farms and the farmland are often located in rural or in the urban hinterland near to one or between several cities (Mert-Cakal and Miele, 2020).

Share payment options: The prices of the food share can be determined by CSA operators as a fixed amount. In most cases this

is arranged in cooperation with members (Sanneh Njundu et al., 2001). With a diversity of different payment options (combination of fixed amount and a solidarity pot as well as graded contributions), CSAs aim to respond to differing economic conditions as well as to the needs of their (potential) members. Barriers related to financial access for membership are often reduced through so-called financing or bidding rounds (e.g., Carlson and Bitsch, 2019; Krcilkova et al., 2019). This special pricing mechanism encourages members to decide individually on the amount of their contribution and takes into consideration their own needs as well as their willingness and ability to pay (Blätzel-Mink et al., 2017). Individuals or households with higher incomes are invited to ease the burden on financially-disadvantaged members by paying more.

Scope of CSA operation: Refers to whether the farm is fully or partially operated with the CSA model. For example, some farms still have traditional distribution channels in addition to the CSA. They use direct sales or other distribution approaches, such as farmers markets or self-harvest gardens, that are not part of the CSA (Chen, 2013; European CSA Research Group, 2016; Carlson and Bitsch, 2019). This allows an existing farm to continue with its other forms of distribution or for the entire farm to graduate step-by-step to the CSA model (see also *establishing paths*).

Size: It is possible to differentiate CSAs according to size, using number of members and households, number of food/harvest shares, as well as the productive land for CSA (e.g., in hectares), or the total revenue of the CSA (e.g., Bashford et al., 2013; Krcilkova et al., 2019; Paech et al., 2021).

3.4 CSA framework visualization

When the various characteristics are considered together, then a CSA framework is reached, which was the first result of this study. Visualized as a framework (Figure 2), it supports a more differentiated view of an individual CSA organization. In this, *community financing* is the *defining characteristic* of the CSA model and is mandatory to be considered a CSA (domain A). It comprises fee financing, cost coverage/full financing, risk sharing, transparency, and direct relations. Furthermore, various *differentiation characteristics* (domain B) illustrate the complexity and diversity of CSAs. By taking the *predominant characteristic* of organizational governance into account, *CSA governance types* (domain B1) enable the distinction according to the question, “who organizes and manages the CSA?.” CSAs with different constellations of actors can be classified as Producer-led CSA (type 1), Consumer-led CSA (type 2), and Integrated (all-in-one) CSA (type 3). The typology contains a definition of each type (see Table 3). *CSA governance* affects the additional *varying characteristics* (domain B2), which are: *Degree of co-decision by members / workers; Founding impulse; Establishing paths; Legal form; Ownership and property for land / operation; Labor and work; Farming methods; Single- or multi-farm; Product variety; Degree of self-production; Share distribution channels; Share distribution area; Share payment options; Scope of CSA operation; Size* (see Figure 1). In sum, there are various differentiation options within each *differentiation characteristic*. For some characteristics, it is possible to choose one out of many options (e.g., one type of the *CSA governance types* at domain B1 or one of the *farming methods*

Community Supported Agriculture (CSA) framework

Framework Domain A	Defining characteristic (mandatory and found in every CSA)								
	Community financing	Fee financing	Cost coverage / Full financing	Risk sharing	Transparency	Direct relations			
Domain B	Differentiation characteristics (shed further light on the CSA diversity)								
Domain B1	Predominant characteristic (every CSA can be assigned to a specific governance type)								
	CSA governance	Producer-led CSA (Type 1)	Consumer-led CSA (Type 2)	Integrated (all-in-one) CSA (Type 3)					
Domain B2	Varying characteristics (specify CSA configurations and vary from CSA to CSA)								
	Degree of co-decision by members/ workers	Relatively low (e.g., online polls, annual shareholder meeting)	Medium (e.g., majority member decisions during the year in addition to the shareholder meeting; working groups possibly with voting rights)	High (e.g., basic democratic decision-making structures, sociocratic form of organization, consensus or consent decisions)					
	Founding impulse	Farm(ers)	Consumer(s)	Both	Through third party				
	Establishing paths	(Partial) conversion of an existing farm to CSA	Establishment of a CSA with new agricultural start-up	Handover of an existing CSA	Spin-off from an existing CSA				
	Legal form	Sole proprietorship (e.g., independent private-run farm)	Non-profit form (e.g., association)	Cooperative form	Mixed form (e.g., combination of non-profit and for-profit forms)				
	Ownership and property for land / operation	Farm(ers)	Member shareholdings	Community (e.g., cooperative)	Other				
	Labor and work	Number of workers full-time	Number of workers part-time	Number of seasonal workers	Members as volunteers	Degree of co-production/ co-work of members (low, medium, high)			
	Farming methods	Conventional (not organic)		Organic (not certified)	Organic (certified)				
	Single- or multi-farm	Single-farm CSA			Multi-farm CSA				
	Product variety	Vegetables	Fruits	Dairy products	Meat products	Eggs	Honey	Processed products	Other
	Degree of self-production	Own production (in %)		Binding additional purchases with risk sharing (in %)	Binding purchases without risk sharing (in %)	Marked-based purchase (in %)			
	Share distribution channels	Home delivery		Farm self pick-up by members	Pick-up point (depot)	Self-harvest			
	Share distribution area	CSA members in urban settings		CSA members in suburban settings	CSA members in peri-urban settings	CSA members in more rural settings			
	Share payment options	Fixed amount		Fixed amount and solidarity pot	Graded contributions	Financing round / Bidding round			
	Scope of CSA-operation	The entire farm is part of the CSA			A part of the farm is part of the CSA				
	Size	Number of members (persons)		Number of food shares	Productive land for CSA (e.g., in hectares)	Revenue of the CSA (e.g., in EUR)			

FIGURE 2
CSA framework (own illustration).

at domain B2). For other characteristics, multiple options are possible (e.g., *product variety* at domain B2) or a number could be specified to quantify the diversity [e.g., *Number of members (persons)* at domain B2]. This selection of options makes the framework usable for research and practice (see survey results in the next chapter as well as discussion in chapter 5).

3.5 Diversity of CSAs in Germany

Regarding the characteristics of the CSA framework, the results of the survey elucidate a diversity of CSA configurations in Germany. Beforehand, we need to point out that some survey questions were answered at the level of the CSA organization (CSA) and others at the level of the individual CSA farm (see definition in chapter 1 and differentiation characteristic *Single/Multi-farm* in chapter 3.1). Overall, 70 CSAs ($n = 70$ CSAs) and in total 81 individual CSA farms ($n = 81$ CSA farms) participated. However, each question (relating to a specific framework characteristic) had a different respondent rate.

The main result is that 55 out of 70 CSAs assigned themselves to one of the three *CSA governance types* (for the distribution of the types see Table 4). This validates our proposal of governance types with a broad distribution in the German context.

Moreover, the survey confirms the existence of diverse ways of *co-decision* in CSAs. 28 out of 41 CSAs integrates forms of consensus and consent, which could be a criterion for both employees and members to help choose a CSA that is right for them. This interrelates with the *founding impulse* of CSAs. For example, 20 out of 57 CSAs were founded by members. In 15 cases, an existing farm initiated the CSA, and in 7 cases, members searched for an existing farm for a partnership. A current German trend is the growth of horticultural farms with only vegetables and/or fruits being founded as new ventures (24 between 2016 and 2022) in relation to farms with livestock being converted (18) (see characteristic *product variety*). In the German context, there is also a diversity of *legal forms* such as sole proprietorship (11 out of 43 CSA farms), non-profit forms like associations (18), and those legally registered as a cooperative (3). As each country has its own legal system with country-specific legal forms, naming and comparing such forms is difficult, however, it should be emphasized that hybrid forms of organizations can exist simultaneously as combinations of different non-profit and for-profit legal forms. Concerning *ownership and property forms*, Blätzel-Mink et al. (2017) noted that only a few CSAs used

collective ownership forms at the time of their study. Our empirical findings confirm this assumption, yet indicate a continuous growth of CSAs with communitized property (15 out of 39 CSAs between 2016 and 2022). Regarding *labor and work*, for example, only seven out of 70 CSAs have requirements for co-production by members using a certain daily or hourly contingent per year. Concerning the *farming methods* most CSA farms produce organically. 26 out of 41 CSA farms are certified and 15 are organic but not officially certified, thereby preventing access to government organic subsidies. Another interesting finding is that 13 out of 81 CSA farms are organized within *multi-farm CSAs* (i.e., CSAs with multiple farms). In terms of *product variety*, the majority integrate vegetable products (67 out of 80 CSA farms) into their food share. A little less than half produce fruits (31) and animal products (36), some produce beverages (34), grain products such as flour, semolina, pasta (11), others bread and bakery products (7). Producing plant-based foods offers great potential to expand product range by the diversification of crop farming or food processing (e.g., European CSA Research Group 2016). Concerning the *degree of self-production* 14 out of 70 CSAs executed marked-based purchases, 8 CSAs went further and integrated binding trading relationships, and 6 CSAs went even further by incorporating risk sharing within their trading partnerships. Regarding *share payment options*, so-called financing or bidding rounds are possible ways to address low-income members in Germany. 39 of 51 CSAs indicate that they use this approach in order to determine share costs. 10 CSAs add the option of a so-called “solidarity pot” to organize their fixed-contribution scheme in a more inclusive way. In terms of *size variations*, the average share size is 141 shares (31 responding CSAs). The size of agricultural land (30 responding CSA farms) ranges from 1 to 58 hectares (mean 5.4), however, there are also farms of up to 200 hectares, although only a percentage of the entire farm is part of the CSA (see *scope of CSA operation*).

An additional empirical result of the survey is linked to various characteristics such as *CSA governance types*, *founding impulse* and *establishing paths* of CSAs. The survey shows that generational succession processes are not yet widely present in German CSAs. 29 out of 81 CSA farms answered in general to the answer options concerning whether or not the succession and handover processes of a CSA operation has been arranged. For example, for 19 CSA farms, succession processes are not yet an issue as most CSAs had only recently started. This could indicate that the question of succession will arise sooner or later, depending on the configuration of the CSA. A further additional result of the survey,

TABLE 4 Formulation in the survey of the German CSA Network with result for distinguishing CSA governance types (own illustration).

Type	Definition used in the survey for the CSAs	Total ($n = 55$)
Producer-led CSA (Type 1)	“In our case, the farm (or farms) takes over the management of the members, the communication to the members, and the recruitment of members. Acceptance is done through formal or informal individual contracts.”	23
Consumer-led CSA (Type 2)	“We have a self-organized member community, which takes care of the administration of, communication to, and recruitment of member(s). The member community bears the acceptance risk through a cooperation agreement. The farm(s) undertake(s) mainly agricultural activities.”	9
Integrated (all-in-one) CSA (Type 3)	“We are a formal organization in which consumers are shareholders. The organization operates the farm and is responsible for managing, communicating with, and recruiting member(s).”	23

without a direct reference to one of the framework characteristics, is that 53 out of 59 CSAs who took part in the survey advise other CSAs that exist or are in the process of being founded. We will discuss this and the other results in more detail in the following chapter.

4 Discussion

This study found that farms using the CSA model are complex organizations whose diversity can be differentiated with the help of the CSA framework. The results show both, a diversity of different characteristics, as well as the variety within each characteristic. This CSA diversity is synthesized and presented in a visualized framework and illustrated with empirical results from Germany. In the following we discuss the findings within the framework domains from both an organizational (chapter 4.1) as well as member (chapter 4.2) and AFN and food sovereignty discourse perspective (chapter 4.3). We conclude with some limitations and include implications for further research (chapter 4.4).

4.1 CSA organization perspective along the framework domains

Based on domain (A), by **clarifying the uniqueness of the CSA model**, CSAs can be **delimited through the defining characteristic community financing** from non-CSAs such as other AFNs, especially those that call themselves a “CSA” but do not realize its *defining characteristic*. This mandatory domain, therefore, has benefits for this discourse, since in practice and in literature, inaccuracies occur. For instance, the CSA definition from [Si et al. \(2020, 68\)](#) does “not include a requirement that the consumers (members) share the production risk (i.e., crop failures) with the farmer.” Another example is, that in numerous “CSAs” in the United States, consumers can book and cancel food on a weekly basis without comprehensive risk sharing (*community financing*), that lies at the heart of the CSA model. These “CSAs” rather correspond to a box-subscription approach with month-to-month subscriptions [see [Smith et al. \(2019\)](#) for various examples]. Our presented definition of CSA in the German context likely goes much beyond the CSA reality in North America as indicated by [Rosol and Barbosa \(2021\)](#). We do see the necessity to define the core of the CSA model to prevent dilution, especially since similar developments are taking place in Germany, where for instance a so-called “solidarity subscription box” is officially promoted as a mixture of CSA along with a monthly cancelable subscription box. In the end these self-labeled “CSAs” do not follow the *defining characteristic community financing*. To prevent confusion and a dilution of the CSA model in Germany, the term “Solidarische Landwirtschaft” (literally translated “solidarity agriculture” or “solidarity farming”) has been legally protected as a trademark.

Based on domain (B1), CSAs can be **classified into the CSA governance typology** and thereby **distinguished among each other through the three CSA governance types** by using the predominant aspect of organizational governance. This typification appears to make sense from both a practitioner and a research perspective and is proven to be useful and coherent even for complex CSAs, as our results show. For example, at a first glance it appears difficult to assign the Australian “Food Connect Brisbane CSA” into our typology.

[Cameron \(2015\)](#) describes this organization as registered not-for-profit company that operates as a cooperative. A particular rather unusual detail, however, is that the cooperative shares are not held by the consumers (CSA members), but rather exclusively by the CSA workers. That means, that the workers – and in this understanding the employed producers, farmers, gardeners, and organizers of the CSA cooperative – are simultaneously the managerial decision-makers and responsible people in this organization. Asking the predominant organizational governance related question of our typology, by whom the CSA is governed, (self-)organized, and (self-)managed, leads us finally to classify this CSA as type 1. The Brisbane CSA seems to be a producer-led CSA, here in the sense of a worker-led CSA cooperative. In addition, this example illustrates the relevance of taking additionally *varying characteristics* into consideration when classifying CSAs into the typology (see also discussion domain (B2) below).

Based on domain (B2), CSAs can be differentiated **through varying characteristics and the diversity within them**. Even though our empirical survey covers just a sample of CSAs in Germany, the results are significant enough to confirm the diversity of CSAs, both, in terms of *CSA governance types* as well as various ways of configuring the further characteristics. For some *varying characteristics*, it is now possible to choose one out of multiple options. For other *varying characteristics*, a number could be specified to quantify the diversity (see chapter 3.1 with the CSA framework visualization). This selection of options can prevent binary understandings and generalizations and makes the framework usable for further research and practice. Based on the study results, we highlight that each CSA is a unique combination of different characteristics and that each can be positioned on a spectrum of different expressions and selection options. Hence, the framework has the potential to open up tensions within discourses inside the German Network, for example, between peasant farms (mostly type 1 producer-led CSA) and on the other hand a significantly larger type 3 CSA [for coexisting discourses within the Network see [Guerrero et al. \(2024\)](#)]. Our findings, moreover, show that the framework has, for example, the potential to support the matching of (potential) founders and workers toward finding their best fitting CSA configuration if based on the framework characteristics. In the meantime, our transdisciplinary research partnership with the Network has already encouraged thinking, talking, and working with different CSA types and their configurations in the context of the Network, and the presented types have been integrated in their consulting activities (see also result transfer by handbook publication in chapter 4.4). In this way, we argue that the framework can be useful for peer consulting among existing CSAs as well as with founding initiatives. This could potentially support organizational development and, as a result, help to maintain and stabilize CSAs over the long term. Thereby, establishing the perspective of CSA organizers as important. For [Adam \(2006, 3\)](#), the success of a CSA depends on the “highly-developed organizational and communication skills” of the organizers. In this context, training courses and the aspect of learning, for example, in managerial, communication, multicultural, leadership, and business running skills, are mentioned ([Mert-Cakal and Miele, 2020](#)).

More comprehensively, the framework can be used to avoid generalizations. Our findings show that, first and foremost, a CSA, in its narrowest sense, with its *defining characteristic community financing*, can be seen as an alternative production-distribution approach. By incorporating organizational perspectives, we show that CSA can be seen

also as an organizational approach. CSAs are complex organizations but not every CSA is also an alternative organization governed, managed, organized, and structured in alternative ways (see diverse expressions within these characteristics). For instance, [Grenzdörffer et al. \(2022, 79\)](#) reveal that a CSA “can be still owned and managed in a conventional, traditional way by a single individual not sharing any decision-making or property rights.” This could indicate that family farms using the CSA model could correspond in particular with the type 1 producer-led CSA, even if they are otherwise organized and structured in traditional ways. In addition to this, it is possible that a family farm exists only to some extent as a CSA (see characteristic *scope of CSA operation*). In this case, the CSA model functions as an independent operation of the farm while there are also parallel farm operations, such as direct sales, that are not part of the CSA model. This may encourage existing (family) farms to change, establishing and expanding their CSA configuration step-by-step over time. In this regard, besides advancing and promoting “alternative” organizational forms, the CSA model proves to also have distinct potential for the preservation of (family) farms, that are organized in “traditional” structures. Interestingly, the CSA model opens up a development space in which both worlds mutually fertilize each other.

In connection with possible changes over time, our findings prove the possibility of dynamic development within CSAs as changeable organizations, especially in times of succession processes, where a window of opportunity can open up for CSAs to change their governance type. Of course, this is possible at any time, for example when a type 1 CSA decides to communitize their entire property in order to set in stone the ecological and social structures of the farm for future generations to come. This perspective is also confirmed by a consultant who states that these “type 1 CSAs most likely will not remain such, at the latest during the generation succession.” He argues that “a high level of trust is necessary for a member-community, that had financed a privately inherited farm for decades in a process of handing it over to people who might not even want to continue this farm [as an CSA].” In these cases it seems possible that the CSA can be transformed into a type 3 by founding their own organization and entering into their own agricultural production [see, for example, [Carlson and Bitsch \(2019\)](#)]. This option is consistent with organization research by [Wiersema and Koo \(2022\)](#) which shows that organizational governance is not static. The dynamic development of and changes in characteristics is also confirmed by CSA studies, such as [van Oers et al. \(2023\)](#), that examine the aspect of unlearning in CSAs based on solidarity and, in particular, the CSA farm conversion process toward solidarity payments (see characteristic *share payment option*). The researchers demonstrate the added value of this unlearning approach to transitions in sustainability. Based on this cited study, we emphasize that, depending on the CSA configuration, the members of a CSA could, for example in producer-led CSAs (type 1), be the initiators of such an unlearning process for farmers and the designers of modified characteristics. This last example illustrates the interrelations between the perspectives of CSA organization and CSA members, which we will discuss next.

4.2 Members’ perspective: more differentiation to choose their “suitable” CSA

Employing a broad understanding, it can be seen that CSA members can be both the holders of a food share as well as the co-owners of community-owned farms, founders and organizers of a CSA, or

co-producers and volunteers in CSAs depending on the specific CSA configuration and governance type (e.g., [Matzembacher and Meira, 2019](#); [Rosol and Barbosa, 2021](#)). In the following, we focus the narrow understanding of CSA members as co-financiers that exchange membership fees for a food share. Currently, it is hard for (potential) CSA members to distinguish between different CSAs in a low-threshold way, especially considering the individual needs and life circumstances of the members (e.g., time aspects related to wage and care work). Currently, joining a CSA is often a random occurrence due to a lack of choice. The reasons for this could be, for instance, that the respective CSA’s pick-up location (see characteristic *share distribution channels*) is close to them, or recommended by a known person who is already a member, or simply because it is the only CSA where free membership shares are available. Based on the results of this study, we argue that public and an easy-to-access differentiation criteria for members could have the added benefit of enhanced commitment stay rates, which can positively impact the long-term stability of CSAs. The diversity within the characteristics of the framework suggests that some CSA configurations can enhance the exclusion of certain kinds of members, whereas others can be a better match. The requirements and unfulfilled expectations of the composition of the products (e.g., wrong or too much food; see characteristic *product variety*) or forms of co-decision-making (see *degree of co-decision*) can lead to dissatisfaction of the members. Other reasons for members leaving a CSA are time constraints and scheduling conflicts (e.g., additional time for picking up the products as well as for cooking food) ([Ostrom, 2007](#); [Zoll et al., 2021](#)). These reasons can result in the cancelation of membership, or in the leaving of one CSA for another. It should be noted, however, that for some members, activities such as meetings, events, or educational activities and, in general, having a close connection to a farm are all important aspects of membership. Other members prefer that a CSA be not privately inherited, and that they can become co-owners of a CSA farm (see type 3 and characteristic *ownership and property*). In contrast, [Cone and Kakaliouras \(1995, 30\)](#) observed already in the 1990s that “from the average member’s perspective, the demands of membership may begin and end with the bag of vegetables.” To prevent any exclusion effects of CSAs, it seems especially necessary that members find a CSA configuration that most suits them. But the results of this study show that so far it is hardly possible for (potential) members to compare CSAs in detail. The presented framework characteristics with its diversity within the characteristics can help to make the diversity of CSAs more visible for members. The findings reported here suggest that in regions with many CSAs, there seems to be a great potential for a digital matching platform (e.g., website, app, quiz) with some selection questions that could support (potential) members to find a CSA that matches their needs, life realities, and values. This platform could indirectly increase the creation of new CSAs. In addition, if members do not find the best CSA configuration in a given region and the potential membership of the demand group reaches a certain number, the respective CSA Network association could support establishing a new CSA. The founding of new CSAs in this way could also be supported through institutional support by policymakers.

4.3 CSA in AFNs and food sovereignty discourses: more differentiation instead of overgeneralization

Besides these discussed CSA-related findings, this study has implications for a more differentiated view and analysis of other AFNs

in revealing generalizations. By including organizational perspectives, the results of our study confirm the impression that there are currently multiple ways to position CSA into existing AFN typologies. Overall, AFN research in general, and typologies in particular, are often based on a trimmed CSA definition that leads to an incomplete classification of this diverse phenomena. Ribeiro et al. (2021, 500), for instance, define CSAs in their AFN typology as a separate type (alongside five others) as “groups of people who have a joint commitment with a farmer, who is paid in advance (for a year or a season), for the produce” (Ribeiro et al., 2021 p. 500). This excludes, for example, the existence of type 3 CSAs (see definition in Table 3). In general, AFNs are associated with shorter distances between producers and consumers as well as small farm size and scale instead of large scale production (Jarosz, 2008). This often underlines a deterministic opposition between alternatives (such as good, small, local, embedded) on the one side, and conventional (such as bad, big, global, dis-embedded) on the other (e.g., Hinrichs 2000; Moragues-Faus 2017). Nevertheless, this binary conception is challenged because of the fluid relationship between alternative and conventional systems and its involved actors, such as AFNs. Alternatives, like CSAs, are embedded in existing economic systems, which can lead to multiple organizational challenges and has implications for the organization itself. The presented framework of this study offers opportunities for a more differentiated view and consideration of these challenges. It shows, for example, that within one CSA conventional, traditional elements are even preserved and deliberately strengthened, whereas at the same time alternative structures are developed showing that alternative and traditional elements may fruitfully complement each other. In addition, the framework enables more differentiation within AFNs. Watts et al. (2005) delimit AFNs based on the two pillars (alternative) food products and (alternative) distribution systems. Accordingly, alternative food can be described as production processes, such as sustainable, organic, or holistic farming and production methods can instead be considered industrial agribusiness (Jarosz, 2008; Forssell and Lankoski, 2015). These aspects can be gathered in our presented framework within *varying characteristics* in domain (B2). According to the second pillar, alternative distribution systems are described as distribution networks that have a producer-consumer relationship within the food sector and a minimal number of intermediaries (Forssell and Lankoski, 2015). This pillar can be connected to the *defining characteristic community financing* in domain (A) of our framework. In favor of a complementing consideration of AFNs, Rosol (2020) argued it does not only include the two pillars of food products and distribution systems, but also their (alternative) economic practices. This third pillar includes (un-)paid work of members, equal pay for all employees regardless of rank, and different forms of economic organization under which cooperatives and collectives are subsumed. This pillar can be incorporated into *varying characteristics* in domain (B2). In studying AFN and CSA discourses, it becomes evident that these are often focused on challenges in sustainable transformations of agri-food systems at the macro (i.e., system) level. In parallel, and in contrast with this level, researchers and food movements rarely integrate internal perspectives of organizations and challenges at the organizational level of AFNs like CSAs, as the additional pillar of Rosol (2020) illustrates. We conclude that a CSA should not be generalized and regarded as a homogeneous AFN type, but be rather marked as a diverse field of its own.

Finally, the findings of this study suggest that a more differentiated consideration of the diversity of CSA characteristics could also help in revealing existing generalizations about CSA, for example, in the food sovereignty discourse. CSA has been described multiple times, both by researchers as well as the CSA movement and the food sovereignty movement, as a practical example of being in line with food sovereignty (e.g., McMichael 2014; Duncan et al., 2019; Paul, 2019; Stapleton, 2019; Maticena and Corvo, 2020; Plank et al., 2020; Parot et al., 2023). Both, CSA and food sovereignty, therefore, are ascribed in the literature as engaged for just and sustainable agri-food system transformations in local and regional economies and the empowerment of people and actors involved in food production, distribution, and consumption. A high degree of participation or forms of collective property in organizations can also be often assessed in a generalized way as being “positive” for food sovereignty (Dekeyser et al., 2018), but our study shows that these aspects are not highly implemented in every CSA as the results regarding the diversity in Germany illustrates (see *degree of co-decision by members/workers and ownership and property*).

4.4 Limits and implications

In the following, we point out limitations, give implications for further research, and further development of the framework. We have deliberately chosen a narrow CSA definition, excluding other AFN forms like self-harvesting gardens, that could lead to confusion since these are subsumed under the umbrella term CSA (e.g., Chen, 2013). We are aware that our focus on German CSAs has limited significance and could be criticized, as some researchers have made the point that European and North American research perspectives are prioritized in the study of AFNs (Zollet, 2022) although we have included CSA literature with an international scope. A shortcoming regarding the survey is that the limited response rate of CSAs which meant that the responses (i.e., number *n*) varied, depending on the question and linked framework characteristic. We made this transparent and provided (*n*) for each question. In addition, some questions were queried at individual CSA farm level, others at CSA organization level in order to take account of their complexity. Moreover, keeping the effort for CSAs and farms within practicable range, the Network decided upon the final survey questions. For this reason, not all framework characteristics include empirical data. Overall, we want to highlight, that the framework and terminology of the CSA *governance types* already affects the international CSA discourse through active exchange, for example, through the adaptation of the typology by research and practice (e.g., URGENCI Network).⁶ We emphasize, however, that CSA configurations can vary widely related to the existing diversity within the characteristics, particularly in other geographic, socioeconomic, and cultural contexts, and others may exist. The framework, therefore, needs to be further discussed and adjusted by both researchers and practitioners.

⁶ URGENCI conducted 2023–2024 a “Worldwide CSA census” (forthcoming). There, the results are presented along our typology. Simultaneously, a scientific publication is being prepared on this basis.

These limitations lead us to further research. Firstly, the framework could be used as a starting point to better understand CSAs worldwide. Research could conduct analyses that are more type-specific in order to avoid generalizations. In addition, there is room to explore the potential in other countries for further or new CSA types and configurations (both from a member and organization perspective). National and international surveys could query the proposed existence of yet unknown types and configurations based on further or differently-expressed characteristics. Secondly, another option to avoid generalizations in CSA and AFN discourses could be to study the individual transformative potential of specific CSA configurations, respectively regarding their social and ecological effects. Even though the aim of this study was not to develop a tool for evaluating such aspects, the framework provides starting points. For instance, it could be studied if CSAs using bidding rounds (see *share payment option*) contribute to the inclusivity of social groups (see matching potential above). Overall, the “differences in consumers’ characteristics, preferences, and attitudes” (Pisarn et al., 2020, 15) should be taken more into account from the perspective of CSA organizers and managers in order to include broader social groups. Further research could, for example, analyze the potential of online tools for enhancing the inclusivity of CSA (see Bos and Owen, 2016). Thirdly, the framework could be adjusted and extended in order to be more context dependent, particularly in other geographical areas where CSA and AFN research is underrepresented, for example, when studying the diversity of food hubs by incorporating organizational perspectives (see Horst et al., 2011) as part of a study that includes various countries. This could involve analyzing drivers and barriers to increase organizational stability and sustain AFNs over the long term (e.g., generational succession). The integration of organizational perspectives and internal challenges, therefore, could enhance agri-food systems-related research.

Considering the previous remarks, the question of future institutional support by policymakers arises. A challenge in policymaking for rural development arises, when assuming that all AFNs or CSAs are equal. In this sense, Grashuis and Su (2019) argue that considering differences (like analyses that are more type-specific) helps to provide a better understanding of the factors that determine their performance, as well as their constraints, by making comparisons among such organizations and across locations. For example, a less-discussed aspect is that policy could promote CSAs that use or establish memberships for low-income people through so-called subsidized or “cost-offset” CSA (CO-CSA) (Pitts et al., 2022).

To consider differences rather than make generalizations corresponds to the aim of this study. The advantage of our framework is that it helps researchers, policymakers as well as practitioners to identify and in particular appreciate diversity and complexity of and within CSAs based on their various possible configurations. As this study was conducted in a transdisciplinary research partnership with the German CSA Network, the results have already been implemented by CSA practice, for example through integration of the framework characteristics and typology into a practical handbook of the German Network, into consulting activities of the Network, as well as currently into a worldwide CSA census by URGENCI, of which both publications are linked collaboratively with the authors of this study. This makes it more practical to use the results of this study, for example, in future CSA consulting activities.

5 Conclusion

This study contributes to the understanding of the diverse CSA phenomenon at the organizational level through the development and application of a CSA framework. Based on literature research and qualitative data, this transdisciplinary study found that CSAs can be differentiated by various characteristics. The framework provides a description of CSAs, considering various characteristics and the diversity of its possible configurations. The multiple selection options make the framework applicable both for research and practice. In this way, the framework contributes to clarifying the uniqueness of the CSA model based on the *defining characteristic of community financing* expressed by fee financing, cost coverage/full financing, risk sharing, transparency, and direct relations (see framework domain A). This *defining characteristic* enables the delimitation of the CSA model from non-CSAs such as other AFNs. Furthermore, the question of how an individual CSA is governed is ascribed as a *predominant characteristic* by literature and practice. Organizational governance is therefore highly suitable for classification and allows the identification of three *CSA governance types* (domain B1): Producer-led (type 1), Consumer-led (type 2), and Integrated (all-in-one) CSAs (type 3). This typology, in combination and interrelation with *varying characteristics* (domain B2), reveals a diverse landscape of CSA configurations, as evidenced by our quantitative survey with German CSAs. Our results prove that each CSA is unique, exists as a complex arrangement, and is even more multifaceted than previously considered (i.e., combination of different characteristics that each can be positioned in various ways with different expressions and selection options). We emphasize that every CSA configuration has its own legitimacy since the coexistence of different CSA types as well as various AFN forms is necessary to cover different needs, life realities, and the values of the people that support them.

Moreover, our findings suggest the potential for dynamic development within CSAs over time, indicating changes in characteristics and governance types. The framework can be used for the matching of (potential) members as well as founders and workers, providing guidance for organizational configurations based on the various characteristics. The implications of our framework therefore extend to supporting the organizational development of existing and new CSAs, contributing to their overall stability and long-term survival. Although CSA is still a niche in agri-food systems limited to a minority of people, our findings offer the potential to better address broader social groups. The framework enhances visibility into the diversity of CSAs, which could benefit scaling up and replicating them.

Finally, our results challenge prevailing overgeneralizations within the discourse on AFNs. We argue that the CSA model is an alternative production model, but not every CSA can be generally categorized as alternative organization, emphasizing the existence of CSAs across a spectrum of both alternative as well as conventional configuration options. Our results even prove that oftentimes elements which are described as rather conservative or traditional are preserved and deliberately strengthened in CSAs, while at the same time alternative forms and structures are developed showing that alternative elements and more traditional elements may fruitfully complement each other. This nuanced consideration of CSAs encourages a more informed dialog, for instance, within the food

sovereignty discourse, as well as with traditional farmers' associations that are often critical about CSA. In conclusion, the CSA framework has the potential to avoid generalizations within CSA, AFN and food sovereignty discourses and beyond.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author/s.

Author contributions

MM and MR designed the research project, structured the paper, collected and analyzed the data, and wrote the manuscript equally together. All authors contributed to the article and approved the submitted version.

Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article. MM was scholar of the Heinrich-Böll-Foundation. MR was part of the research project “nascent - New opportunities for a sustainable food system by transformative business models” (01UT1928) and is currently part of the ongoing research project “SolaRegio-Community Supported Agriculture in the context of innovation ecosystems” (01UY2212), both funded by the German Federal Ministry of Education and Research (BMBF). The University of Kassel supported the publication with the Open Access Publication Fund.

Acknowledgments

As we perceive knowledge creation and scientific writing as a highly collaborative process, we would like to express our gratitude to

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some important people in the development of this paper. We are grateful to the editors and the reviewers, who helped improve this manuscript tremendously with their feedback. Furthermore, we would like to thank everyone who participated in this transdisciplinary study. This includes many German CSAs as well as experts and other participants of focus groups and interviews, numerous people engaged in the German CSA Network's environment such as members of their internal working groups (e.g., “Research”, “Consulting”, “Cooperatives”), especially Katharina Kraiss and Simon Scholl (German CSA Network), as well as Jocelyn Parot (international CSA Network URGENCI). In addition, we thank Veikko Heintz, Laura Carlson, Irene Antoni-Komar, Niko Paech, Dirk Posse, Moritz Wittkamp, Maren Busch, Sinje Grenzdörffer, Christian Herzig, Franz-Theo Gottwald, and many more colleagues and companions for supporting this study and manuscript preparation. Finally, we thank Antonia McGinn and Richard Peters for linguistic revisions.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsufs.2024.1205809/full#supplementary-material>

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