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Scaling local food: A literature review on the organization, benefits, and challenges of food hubs

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Abstract

Direct-to-consumer channels have developed as alternatives to conventional agri-food systems characterized by long supply chains, market concentration, and limited connections between producers and consumers. Yet despite their potential, these channels face significant limitations that constrain their expansion and keep them largely confined to niche markets. In response, food hubs have emerged as intermediaries that aggregate and distribute products from multiple farms, enabling small- and medium-sized producers to reach institutional buyers while preserving the goals and values of local food systems. Synthesizing evidence from 34 peer-reviewed empirical studies, this review consolidates a dispersed body of research by clarifying the organizational and marketing structures, financing approaches, and documented impacts of food hubs. In doing so, the review shows that food hubs should be understood not simply as alternative distribution channels but as organizational intermediaries whose viability depends on the complex coordination of logistics, revenue streams, stakeholder relations, and economic and social objectives. It also highlights persistent challenges in farmer coordination, institutional market stability, and financial resilience that

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underscore the difficulties of sustaining food hubs and scaling local food systems.

Keywords
food hubs, farm-to-institution, supply chain coordination, local food systems, institutional procurement

Introduction

For more than two decades, direct-to-consumer channels such as farmers markets, on-farm sales, and community supported agriculture (CSA) programs have multiplied as strategies to reconnect producers with consumers (Enthoven & Van den Broeck, 2021; Low et al., 2015; Micheels & Boecker, 2017). Often framed as alternatives to the industrial food system, such channels promote social embeddedness through shorter supply chains and production transparency (Enthoven & Van den Broeck, 2021; Hinrichs, 2000). As such, they have been credited with strengthening farmer-consumer relationships while delivering economic and social benefits (Brown & Miller, 2008; Hinrichs, 2000; Kneafsey et al., 2013; Mundler & Laughrea, 2016).

However, research suggests that direct marketing channels encounter structural limits, as they require significant labor, generate low revenues, and remain confined to narrow markets (Azima & Mundler, 2022; Hardesty & Leff, 2009; Mount, 2012; Park, 2015). For small- and medium-sized farmers, reliance on these channels constrains growth and places heavy demands on their time and resources, often resulting in self-exploitation (Bruce & Som Castellano, 2017; Galt, 2013; Park, 2015). Additionally, in the U.S. and elsewhere, growth in direct-to-consumer channels has slowed in recent years, underscoring the difficulty of sustaining such models at larger scales (O'Hara & Benson, 2019; Stobbe, 2023; U.S. Department of Agriculture, National Agricultural Statistics Service [USDA, NASS], 2022).

These limitations have sparked interest in new distribution models that preserve local food values while increasing returns and market access for small- and medium-sized farmers (Blay-Palmer et al., 2020; Dimitri et al., 2019; Renkema & Hilletofth, 2022). Among the most prominent models are food hubs, which have garnered increased attention among scholars and policymakers (Barham et al., 2012; Levkoe et al., 2018; Matson et al., 2015). Food hubs are commonly defined as intermediaries that aggregate and distribute products from multiple farms, with the dual goal of expanding markets for producers and improving consumers' access to local food (Barham et al., 2012; Kneafsey et al., 2013). Food hubs are distinguished from direct-to-consumer outlets by their ability to pool logistical resources and administrative functions, allowing them to serve intermediate buyers, including restaurants, specialty grocery stores, schools, and hospitals (Matson et al., 2015). In this review, we use "institutional clients" and related terms as shorthand for this broader set of buyers. By channeling local products through these buyers, food hubs create a model that is one step removed from direct sales yet still anchored in the principles of the local food movement (Barham et al., 2012; Levkoe et al., 2018). This positioning allows them to operate between conventional distributors and direct marketing arrangements, combining broader reach with a continued emphasis on food proximity and community values.

The development of food hubs also reflects broader debates on how to scale up local food systems while preserving their territorial and social embeddedness (Blay-Palmer et al., 2020; Kneafsey et al., 2013; Renkema & Hilletofth, 2022). By pooling marketing and distribution functions, food hubs can provide small- and medium-sized farms with the infrastructure needed to reach otherwise inaccessible institutional markets, including trucks, cold storage, processing and packaging equipment, and IT systems (Levkoe et al., 2018; Matson et al., 2015). At the same time, their emphasis on institutional procurement can create new challenges, such as meeting regulatory requirements, ensuring consistent supply, and coordinating among diverse producers (Barham et al., 2012; Levkoe et al., 2018).

Research on food hubs is growing but remains fragmented across diverse themes and empirical contexts (Dimitri et al., 2019; Renkema & Hilletofth, 2022). To date, this body of research has not been systematically evaluated, underscoring

the need for a comprehensive review of empirical studies to clarify the role of food hubs in scaling and supporting local food systems (Dimitri et al., 2019; Enthoven & Van den Broeck, 2021; Renkema & Hilletofth, 2022).

This article addresses this gap by conducting a literature review of food hubs, guided by the following questions: (1) How do food hubs organize their logistics and marketing? (2) What legal structures, stated goals, and staffing profiles characterize food hubs? (3) What are the benefits of food hubs for farmers and communities? (4) What roles do external (e.g., grants) and internal (e.g., private capital, membership fees) financing play in food hub development? (5) What challenges hinder the growth and sustainability of food hubs?

The remainder of the article is structured as follows: The next section outlines the methodology used to identify and screen relevant studies. We then present the results, organized around the five research questions. The Discussion and Conclusion section situates the findings within broader debates on the sustainability of local food systems and considers future directions for research.

Applied Research Methods

For this study, we conducted a rapid review, a form of knowledge synthesis that follows the same general procedures as systematic reviews but uses streamlined search and screening protocols to address time and resource constraints (Moons et al., 2021; Tricco et al., 2015). While rapid reviews are less resource-intensive than systematic reviews, they still require a rigorous and transparent methodology (Haby et al., 2016; Moons et al., 2021). Rapid reviews are especially valuable when evidence must be generated quickly to support policymaking (Garritty et al., 2021).

As shown in Table 1, we selected inclusion and exclusion criteria to assess study relevance based on a working definition of food hubs from the literature (Diamond & Barham, 2012; Horst et al., 2011). This ensured the exclusion of studies that might have used the term for unrelated platforms, such as food banks, food terminals, supermarkets, or other corporate aggregators. We also limited our review to studies drawing at least in part on quantitative or qualitative data, excluding purely conceptual discussions of food hubs. Following Garritty et al. (2021), we restricted the number of databases consulted and limited the search to articles published in scholarly journals, meaning that gray literature was excluded. These choices aligned with our rapid review protocol, which required limits on scope and sources. Additionally, the review was limited to studies published between 2003 and 2023, the year in which the literature search was conducted. The cutoff of 2003 was chosen to reflect the rapid evolution of local food systems over the past two decades and the relatively recent emergence of food hubs.

Two databases were selected for the searches:

Table 1. Inclusion and Exclusion Criteria for Studies on Food Hubs

Inclusion criteria	Exclusion criteria
Focuses on food hubs defined as intermediaries that aggregate and distribute products from multiple producers	Uses “food hub” to refer to unrelated entities, such as food banks, food terminals, supermarkets, and other corporate aggregators
Involves marketing to institutional clients (e.g., schools, hospitals, specialty grocery stores)	Describes only direct-to-consumer models
Presents quantitative or qualitative data	Purely conceptual papers, commentaries, or theoretical models
Addresses at least one of the five research questions	Does not address any of the research questions
Peer-reviewed journal articles	Gray literature, reports, or non–peer-reviewed sources
Published in 2003 or later	Published before 2003
English or French	Other languages

Web of Science and ABI/INFORM Global. We then formulated search terms related to food hubs (see Table 2) and included truncation (*) to capture lexical variants. As noted, our criteria incorporated a working definition of food hubs to exclude studies that might use the term in unrelated contexts. Similarly, it was important not to overlook studies that evaluated food hubs without explicitly using the term or that used alternative terms we had not anticipated. Consequently, in addition to "*food hub*," we included keywords closely related to food hub activities (e.g., "*farm-to-school*").

The search strategy was further enhanced by pairing terms. For instance, we paired "*procurement*" and "*food*," requiring a maximum of five words between the terms (to capture variations such as "*procurement of food*" and "*public food procurement*"). For all pairings, we limited results to studies that also contained "*farm,*" "*producer*," or "*local*."

Figure 1 contains the PRISMA flow chart summarizing the screening and selection process, which was managed using the Covidence software platform. After removing duplicate records, we screened the titles and abstracts using the criteria in Table 1, adopting an inclusive approach so as to only exclude clearly irrelevant articles (Lefebvre et al., 2019). The full texts of the remaining articles were then assessed for eligibility. Following these two screening stages, 34 studies satisfied all criteria and were included in the final review.

We then created a fillable template in Covidence with five text fields, each corresponding to one research question. If a study addressed a question, the relevant passages were copied into the corresponding field; if not, the field was left blank. This approach allowed us to analyze articles deductively using predefined thematic categories. After data extraction, we exported the content to Microsoft Excel and conducted an inductive analysis to identify cross-cutting themes and insights. The results of this assessment are presented in the following section.

Results

Most studies were conducted in the U.S. (n = 30), with smaller numbers carried out in Canada (n = 1) and France (n = 2), and one study drawing on data from 15 European countries. Although the review spans the period from 2003 to 2023, the earliest included study dates from 2011. Publication activity has increased markedly since 2018, reflecting growing scholarly interest in food hubs.

The 34 studies reviewed here do not constitute a uniform sample of food hubs. Rather, they include single- and multiple-case studies, national survey- or directory-based analyses, policy reviews, and related empirical studies in which food hubs are examined as part of broader local and regional food systems. Where reported, the number of hubs considered per article ranges from one or two in several detailed case studies to dozens or hundreds in larger multi-hub samples and national survey- or directory-based analyses. We therefore treat the reviewed literature as evidence of the range of food hub models and issues examined in prior scholarship, rather than as a countable census of distinct food hubs. Accordingly, throughout the review, statements about food hubs should be understood as referring to the hubs examined in the studies cited, rather than to food hubs generally.

Table 2. Search Strategy and Keywords Used in the Rapid Review

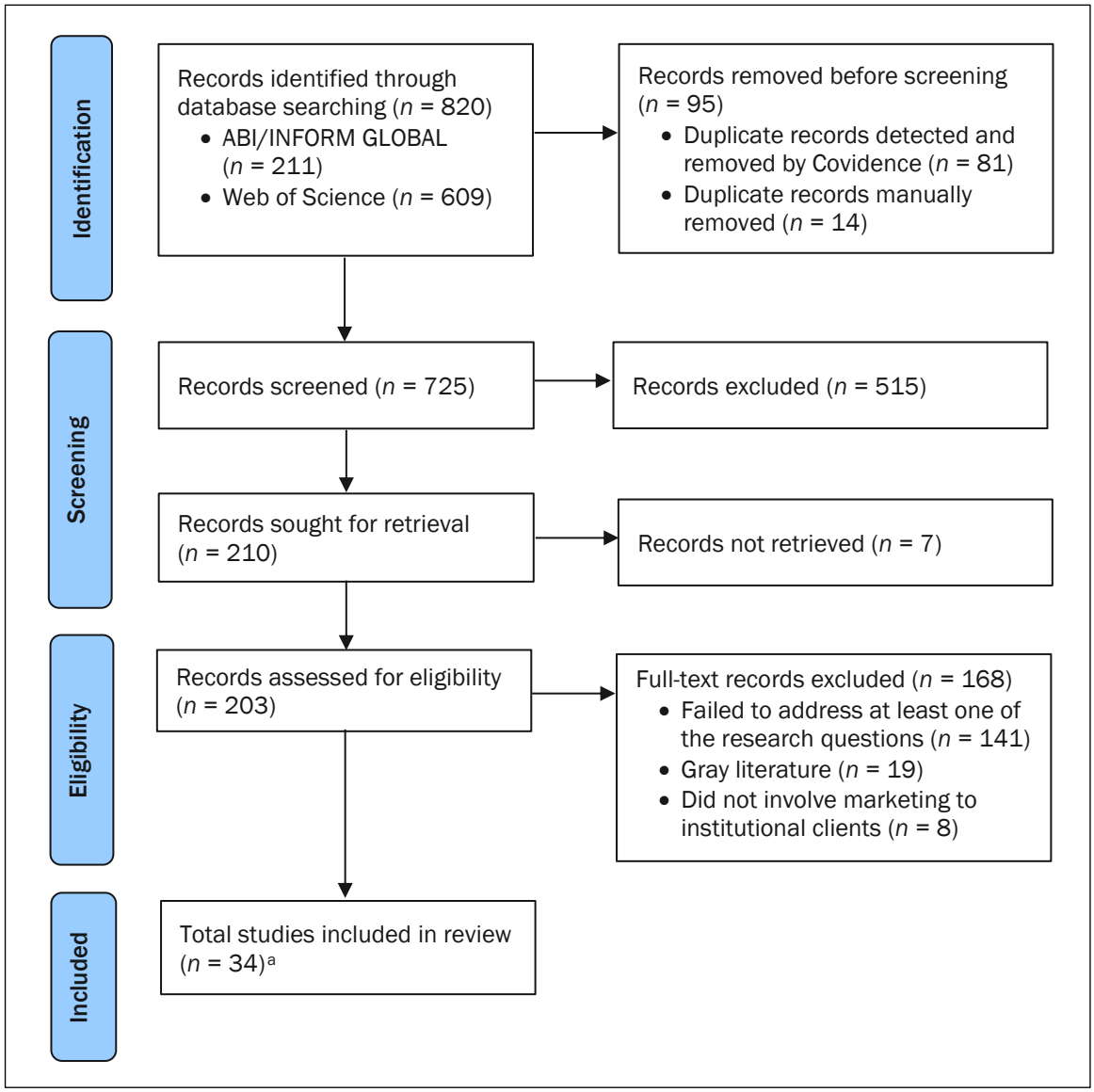
Core terms		Additional search terms
("*food hub**" OR "*farm-to-institution**" OR "*farm-to-school**" OR "*farm-to-hospital**" OR "*farm-to-restaurant**")		N/A
OR		
(*procurement* NEAR/5 *food**)	AND	(*farm** OR *producer** OR *local**)
OR		
(*institution** OR *public** NEAR/5 *foodservice**[a])	AND	(*farm** OR *producer** OR *local**)

Logistics and Marketing Operations

Food hubs operate under a range of business models that differ in product focus, scale of operations, customer profiles, and organizational networks. From a marketing perspective, many hubs combine wholesale sales to institutional clients with direct-to-consumer initiatives, such as CSA programs (Schmidt et al., 2011). Nearly half of surveyed U.S. food hubs also marketed at least some products through their own retail outlets (Fischer et al., 2015a). Pricing practices vary accordingly, with institutional clients often benefiting from lower rates due to economies of scale (Schmidt et al., 2011).

Most surveyed U.S. food hubs reported annual revenues below US$500,000 (Fischer et al., 2015b), although a small number of long-standing organizations that predate the term "food hub" recorded much larger sales volumes (Fischer et al., 2015a). The COVID-19 pandemic and resulting closures of

Figure 1. PRISMA Flow Chart of the Study's Selection Process



[a] Thirty-five articles remained after full-text screening, but two articles by the same authors presented almost identical findings and were therefore merged in the final count.

schools and restaurants significantly disrupted hub operations, pushing many hubs to pivot, at least temporarily, to direct-to-consumer channels. These disruptions also spurred the creation of interhub partnerships to balance surpluses and shortages caused by COVID-19–related market shocks (Fardkhales & Lincoln, 2021).

Product diversification has also accelerated. While fruits and vegetables predominate, a growing number of hubs market meat and poultry, and some even extend their offerings beyond farm products, as in the case of a Georgia hub that pairs farm produce with items from local food artisans (Entsminger, 2020; Furman & Papavasiliou, 2018; Jablonski et al., 2011).

Certain marketing routines appear across the literature. Typically, hubs update weekly product lists with prices and quantities and share them with clients via phone, email, or online platforms (Feenstra & Hardesty, 2016; Jablonski et al., 2011). Client orders are then consolidated and communicated back to farmers (Hyland & Macken-Walsh, 2022). Cleaning, organizing, and packaging may be done on-site or handled by farmers in accordance with the standards set by institutional buyers (Schmit & Severson, 2019). Farm-to-hub transportation arrangements vary, with some hubs requiring farmers to deliver directly while others rely on employees, subcontractors, farmer volunteers, or shared drop-off points, such as producers' refrigerated warehouses, farmers markets, or the offices of extension agencies (Cleveland et al., 2014; Rogers & Fraszczak, 2014).

Upon arrival, produce is inspected, and items failing to meet standards are returned (Schmit & Severson, 2019). In the studies reviewed, we did not identify alternative outlets for rejected products, such as processors or other buyers. Farmers unable to provide regular volumes may be excluded, with the option to return once deliveries become more consistent (Cleveland et al., 2014). Quality and volume requirements are typically more stringent than in direct marketing channels, meaning food hubs often rely on medium-sized producers capable of delivering regular quantities (Brislen, 2018). However, the reviewed literature gives limited attention to how hubs accommodate farms of different sizes or levels of supply consistency.

Because food hubs often receive the same product from multiple farms, different arrangements are used to coordinate marketing. When hubs handle both certified products (e.g., organic) and noncertified products, the latter are sold separately to clients who do not require certification (Schmit & Severson, 2019). Additional quality control measures are sometimes implemented. For instance, large supplies of the same item may be pooled by quality, with similar-grade products sold together; producers then receive the average selling price (Schmit & Severson, 2019). This strategy prevents farmers with lower-grade products from mixing them with higher-grade ones to obtain a premium. Even when batches are consolidated, however, produce may be delivered in labeled boxes to ensure traceability and marketing transparency (Feenstra & Hardesty, 2016).

Deliveries to clients usually occur once or twice weekly, and most produce reaches customers within 48 hours of harvest, a time frame that is essential for many institutional kitchens (Cleveland et al., 2014; Hyland & Macken-Walsh, 2022; LeBlanc et al., 2014). Orders may be delivered by hub employees, volunteer farmers, or subcontractors, or collected directly from the hub by institutional client staff (Knigge et al., 2016; Rogers & Fraszczak, 2014). Alternatively, orders can be sent to collection points (Hyland & Macken-Walsh, 2022; Jablonski et al., 2011).

Financial and marketing practices further distinguish hubs from conventional distributors. For instance, many pay farmers upon delivery, a practice uncommon in conventional supply chains but seen by hub managers as a way to build trust (Furman & Papavasiliou, 2018; Schmit & Severson, 2019). The final payment to farmers typically follows product sales, minus handling costs. Some hubs also implement noncompete clauses, which restrict farmers from supplying institutional clients directly (Motzer, 2019), although managers may lift these restrictions when direct sales are more practical. In California, for example, one food hub connected its farmers and institutional buyers when proximity made direct delivery more efficient (Cleveland et al., 2014). However, the study in question did not specify whether these transactions remained within the

hub's system or occurred directly between farmers and buyers.

Competition management also differs across hubs. Some hubs list only the lowest-priced supplier for each product (Feenstra & Hardesty, 2016), while others avoid this practice to limit rivalry among farmers and maintain quality standards (Cleveland et al., 2014). Pricing strategies can also vary. In hubs with strong social objectives, farmers set prices, and preferential pricing or bargaining is discouraged (Cleveland et al., 2014; Feenstra & Hardesty, 2016; Jablonski et al., 2011; Pesci & Brinkley, 2022). However, managers may advise farmers on adjustments to ensure that prices align with market realities and to allow hubs to apply mark-ups that cover overhead costs (Cleveland et al., 2014; Feenstra & Hardesty, 2016). Reported margins range from 20–25% (Motzer, 2019) to around 30% (Feenstra & Hardesty, 2016; Jablonski et al., 2011). Some evidence suggests that these rates are higher than those of conventional distributors (Feenstra & Hardesty, 2016).

Collaboration with farmers on crop planning is also common and is designed to reduce waste and guarantee reliable supplies (Cleveland et al., 2014; Feenstra & Hardesty, 2016; Schmidt et al., 2011; Schmit & Severson, 2019). Generally, these efforts are based on good-faith commitments rather than formal contracts (Schmit & Severson, 2019). Additional strategies are sometimes adopted to mitigate production risks. For instance, Cleveland et al. (2014) report on a California food hub that focused on six produce items, which allowed for better production forecasts and easier order planning for institutional customers. Some hubs go further by coordinating staggered harvests across farms to stabilize supplies (Schmit & Severson, 2019).

Infrastructure choices depend on hub size, age, and resources, as well as the availability of subcontractors. Smaller hubs tend to rent facilities and contract out transport, whereas larger ones often own infrastructure and subcontract only for longer-distance deliveries (Schmit & Severson, 2019). For younger hubs, mobile cold storage units have proven a cost-effective alternative to permanent infrastructure (Hyland & Macken-Walsh, 2022; Knigge et al., 2016).

Hubs also increasingly process products, either in-house or through third-party contractors, which extends the marketing season and reduces waste by allowing the sale of imperfect produce (Martinez, 2016; Thompson & Stinnett, 2018; Wen & Connolly, 2022). In many cases, institutional buyers demand semi-prepared fruits and vegetables due to limited in-house processing equipment (Rogers & Fraszczak, 2014).

The geographical area served by hubs varies, as some cover whole regions or administrative territories, whereas others draw from farmers within a specific radius, highlighting the flexible definition of "local" (Cleveland et al., 2014; Rogers & Fraszczak, 2014). Many hubs also emphasize transparency by listing farmer names, farm locations, and production methods on packaging, information that institutional buyers often share with clients (Conner et al., 2020; Feenstra & Hardesty, 2016). However, expanding distribution can complicate this individual attribution. While branding products under a hub's label has been suggested as a solution (Motzer, 2019), some institutional buyers may remain skeptical of such labeling and may prefer to know the specific farm source (Conner et al., 2020). These preferences suggest that the social dimension of direct sales and the importance of farmer-consumer relationships remain significant even for institutional clients (Pesci & Brinkley, 2022; Rogers & Fraszczak, 2014).

Legal Structures, Goals, and Staffing in Food Hubs

Food hubs typically pursue both economic and social objectives. In the 2013 National Food Hub Survey, 52% cited farmer support and 49% cited local food in their mission statements (Fischer et al., 2015a). Additional objectives include food access (22%) and improving human health (60%), while educational activities are also common, including public awareness about food systems issues (56%) and nutrition or cooking education (47%) (Fischer et al., 2015a). Many hubs also commit to sourcing from small- and medium-sized farms (Nelson & Landman, 2020; Shariatmadary et al., 2023). Lastly, some hubs aim to supply disadvantaged neighborhoods (Rutz et al., 2018) or support minority farmers and other marginalized

groups (Nelson & Landman, 2020; Rutz et al., 2018).

Legal structures vary: Hoey et al. (2018), drawing on the U.S.-based 2017 National Food Hub Survey, report that nationally 42% of food hubs are nonprofits, 37% are for-profits, and 21% operate with mixed legal models, such as public-private or university/community partnerships. Hubs are shaped by their mission and activities, as well as the expectations of participating stakeholders and clients (Saul et al., 2021), and some adopt dual legal structures to accommodate this diversity. For instance, a New York hub created a for-profit food distribution platform for its institutional clients and a nonprofit entity to run its anti-hunger program (Jablonski et al., 2011). Farmers can also influence hub governance, although organizational preferences may diverge. Schmidt et al. (2011), for instance, recount the case of a hub in the U.S. Midwest where some producers advocated for a cooperative model, while others preferred to remain independent suppliers rather than participate directly in hub governance.

Nonprofit incorporation is common when hubs combine economic and social objectives (Hoey et al., 2018). LeBlanc et al.'s (2014) Vermont case studies show that nonprofit food hubs may begin as grassroots initiatives with limited paid staff, infrastructure, and farmer participation. By contrast, other hubs in their sample operated through umbrella organizations that provided staff support and resources, while farmer engagement occurred through formal mechanisms such as annual meetings and board representation.

Adequate staffing is essential for hubs: most employ at least five workers, either on a year-round or seasonal basis (Fischer et al., 2015b; Motzer, 2019). However, start-up hubs often struggle to fund staff, and while volunteers can fill gaps, core operations require paid employees (Schmidt et al., 2011). To compensate, some start-ups turn to consultants or advisory boards of community members and professionals who contribute expertise free of charge (Schmidt et al., 2011). Assistance may include writing business plans and offering technical and marketing advice to participating farmers (Hyland & Macken-Walsh, 2022).

In addition to general management duties, hub employees are expected to cultivate relationships with buyers, highlight producer identities, and differentiate the hub from conventional distributors (Feenstra & Hardesty, 2016). Staff thus play a crucial intermediary role by relaying feedback and information between farmers, institutional clients, and funders, a task that requires both sales expertise and strong communication skills (Conner et al., 2020; Feenstra & Hardesty, 2016; Pesci & Brinkley, 2022; Schmit & Severson, 2019). Trust and regular exchanges between managers and farmers also give farmers the confidence that their output will be sold, allowing them to adjust their crop choices to meet institutional demand (Brislen, 2018; Cleveland et al., 2014). Open communication also makes it easier for farmers to anticipate orders and flag production constraints, such as weather- or pest-related issues (Brislen, 2018).

Advantages of Food Hubs for Farmers and Communities

Food hubs generate documented benefits for local economies, producers, and rural regions. For instance, Jablonski et al. (2016) found that a US$1 million increase in demand for food hub products generates gross output and employment multipliers of 1.75 and 2.14, respectively. Moreover, when opportunity costs are included, the output and employment effects, while smaller, remain positive, at 1.57 and 1.94, respectively, with limited displacement of spending in other sectors, estimated at US$0.11 per dollar.

Food hubs also play a role in supporting "agriculture of the middle," namely, medium-sized producers who are too large to rely solely on direct sales yet too small to use conventional distributors (Brislen, 2018; Stevenson et al., 2011). Farmers report increased sales, income, and production from hub participation (Conner et al., 2018; Jablonski et al., 2011; Motzer, 2019; Schmidt et al., 2011). They also value the prompt and consistent payments associated with such platforms and report satisfaction even when sales to hubs remain a modest component of overall farm revenue (Conner et al., 2018). In some regions, food hubs have been credited with agricultural resurgence, enabling producers to earn a living from farming and, when demand is steady, to lease new land for

expanded production (Cleveland et al., 2014; Motzer, 2019). At the same time, individual food hubs, even well-established ones, may reach only a limited share of farms in a region. Consequently, while hubs can contribute to rural development, their capacity to reverse broader patterns of rural decline remains limited without wider systemic interventions (Motzer, 2019).

Farmers report that food hubs allow them to access institutional customers that would otherwise be out of reach (Conner et al., 2018; Hyland & Macken-Walsh, 2022; Jablonski et al., 2011). Food hubs make this possible by taking on numerous administrative responsibilities that individual farmers would otherwise have to manage themselves, including customer relations, invoicing, and delivery (Motzer, 2019). This delegation of tasks reduces the number of hours farmers spend on marketing compared to direct sales channels (Jablonski et al., 2011). Hubs are also credited with offering more secure outlets for perishable produce, enabling farmers to minimize financial losses and reduce food waste (Cleveland et al., 2014). On the institutional buyer side, the aggregation of supply from multiple farms ensures greater product availability and lessens the impact of farm-level crop failures (Schmidt et al., 2011).

Access to institutional clients through hubs is especially beneficial for beginning farmers (Brislen, 2018; Jablonski et al., 2011; Motzer, 2019), as it provides a reliable source of income and reduces uncertainties associated with direct sales, such as unstable earnings and low retention rates in CSA programs (Brislen, 2018). Similarly, producers who inherit family farms are often drawn to food hubs as a way to sustain their agricultural legacy while diversifying their client base (Brislen, 2018).

Food hubs also provide technical assistance and training opportunities for members. For instance, in a content analysis of 50 food hubs in U.S. metropolitan areas, Shariatmadary et al. (2023) found that about one quarter of the hubs offered technical assistance or training to farmers, including support for sustainable production. Other services include training for producers seeking organic certification or developing new business skills (Jablonski et al., 2011; Motzer, 2019). At a hub in New York State, for example, staff organize regular meetings among farmers, managers, and institutional clients, providing farmers with mentorship and feedback on issues such as invoicing, labeling, and market opportunities (Jablonski et al., 2011). Similarly, in a California hub, members receive guidance on institutional buyers' expectations regarding packaging, post-harvest handling, and sanitary practices (Feenstra & Hardesty, 2016).

Participation also enhances the market credibility of farmers, with many reporting that hubs promote their products effectively and strengthen their capacity to collaborate with other buyers (Conner et al., 2018). By participating, farmers signal reliability and familiarity with industry standards, in some cases enabling them to sell directly to institutional customers outside the hub's network (Brislen, 2018).

Lastly, food hubs play a bridging role between rural producers and urban markets. For many small- and medium-sized farms, particularly those run by new entrants, these markets are difficult to penetrate without intermediaries (Brislen, 2018). Hubs fill the gap by training farmers in food handling and safety; arranging bulk purchases of supplies (e.g., packaging); and raising awareness about urban consumer preferences, which can be opaque to producers (Brislen, 2018). This support is also visible during preseason planning, when some hubs work with members to align crop choices and volumes with anticipated demand (Schmidt et al., 2011).

Financing Food Hubs

Food hubs draw on diverse sources of finance, especially in the start-up phase. External support can include grants, low-interest loans, or other forms of nonrepayable capital disbursed by public agencies or philanthropic foundations (Fischer et al., 2015b; Hoey et al., 2018; LeBlanc et al., 2014). In addition to revenue from sales, food hubs may rely on supplementary financing streams such as donations, farmer membership fees, and contributions from founders (Entsminger, 2020; Fournier et al., 2020; Rysin & Dunning, 2016; Saul et al., 2021). Hubs may also benefit from in-kind support provided by post-secondary institutions, local agencies, volunteers, or charitable organizations (Fournier et al., 2020; Saul et al., 2021). A hub's

legal status can influence funding eligibility, with many adopting nonprofit status to qualify for public or private grants (Jablonski et al., 2011).

USDA programs, as well as state- and regional-level initiatives, indirectly support food hubs by encouraging institutions, such as schools and hospitals, to source local or organic food (Hoey et al., 2018; Roche et al., 2014; Rogers & Fraszczak, 2014). As mentioned, the COVID-19 pandemic created severe operational challenges for hubs following the closure of schools and restaurants. Federal emergency programs in the U.S. provided relief either directly to hubs or indirectly through subsidized programs in which hubs participated. This support helped mitigate losses and allowed hubs to redirect efforts toward direct sales and other initiatives until institutional client demand resumed (Saul et al., 2021).

In a 2019 national survey, one third of U.S. food hubs relied on external financial assistance to sustain operations (Shariatmadary et al., 2023). Economically, such funds help bridge the gap between conventional market prices and the higher per-unit production costs of small- and medium-sized producers, enabling hubs to offer competitive prices to customers (Perrett & Jackson, 2015). They also offset operational costs, which are proportionally higher for hubs than for large conventional distributors that benefit from economies of scale (Fischer et al., 2015b; LeBlanc et al., 2014). Likewise, external funding can be used to hire personnel and support the development of business plans, websites, promotional materials, or farmer training programs (Saul et al., 2021; Schmidt et al., 2011).

This reliance on external financial support has been criticized on the grounds that lags between grant applications and disbursements create management challenges (Jablonski et al., 2011). Hub managers themselves acknowledge that dependence on outside funding can mask structural problems with profitability (Saul et al., 2021). Producers and distributors unaffiliated with hubs also argue that financial support distorts competition by giving supported hubs an advantage over businesses that do not receive comparable assistance (Perrett & Jackson, 2015).

Researchers remain divided over the required duration of outside financial assistance. Some argue that it should be temporary or should naturally taper off within three to five years as hubs move toward self-sufficiency (Fischer et al., 2015b; Rysin & Dunning, 2016). A study in Michigan illustrates this pattern: sampled hubs operating for one year or less relied on external funding for 53% of their revenue, while those active for three years or more had reduced that share to 28% (Hoey et al., 2018).

Others contend that continuous external funding may be justified as an investment in public goods that generates positive externalities (Rysin & Dunning, 2016; Saul et al., 2021). The argument is that hubs often take on responsibilities neglected by public authorities, such as providing extension services for small- and medium-sized farmers or addressing food insecurity in disadvantaged communities. Consequently, the need for funding to pursue economic and social objectives may reflect the failure of public institutions and policies to adequately support equitable food access and regional food infrastructure, rather than shortcomings in the hub model (Hoey et al., 2018; Nelson & Landman, 2020). External financial assistance may also serve longer-term governance objectives in certain contexts, as illustrated by a case in France where local authorities maintained funding to influence a hub's development (Fournier et al., 2020).

Scholars debate the effects of external aid, such as grants, on hub decision-making. As mentioned, Jablonski et al. (2011) emphasize the risks created by funding delays, but others argue that outside financial support creates a safer environment for experimentation. According to this perspective, such contributions enable adaptive learning, midcourse corrections, and risk-taking, all of which foster innovation and allow hubs to function as laboratories for sustainable solutions (Hoey et al., 2018; Schmidt et al., 2011). Some researchers also stress that other funding sources are usually limited, especially during the start-up phase (Saul et al., 2021). For instance, introducing or raising farmer membership fees is rarely viable given the modest revenues of many participants. Likewise, private investment is often deterred by the uncertain or low returns from hub activities (Fournier et al., 2020).

As noted, many food hubs pursue both social and economic goals, a balance that can be hard to

sustain without external support (Fischer et al., 2015b; Hoey et al., 2018; Rutz et al., 2018). Indeed, a 2013 U.S. survey found that hubs undertaking "plus activities," such as nutrition or cooking education, were more likely to rely on outside financial assistance (Fischer et al., 2015a). Likewise, in their Michigan study, Hoey et al. (2018) found that nonprofit food hubs relied most heavily on external funding, drawing an average of 70% of their revenue from grants, donations, or government sources, compared with 46% for mixed-model hubs and 0% for for-profit hubs. Nonprofit hubs also reported the highest average number of socially oriented activities. Four hub partners or managers interviewed for the same study suggested that dependence on external funding could be reduced through cross-subsidization, whereby profits from higher-margin markets or product sales help cover the costs of social initiatives that operate at a loss. This strategy, however, was framed as difficult to sustain because it depended on hubs expanding into more profitable markets, attracting customers able to pay higher prices, or broadening their product range to include nonlocal foods.

Obstacles to Growth and Sustainability

Despite their potential to strengthen local food systems, several factors limit food hub development. Martinez (2016), drawing in part on the 2015 National Food Hub Survey, notes that food hubs often face numerous challenges, including working with multiple producers, managing delivery logistics, securing enough product supply to meet buyer demand, and obtaining the capital and infrastructure needed for growth. Stakeholders in a study from Georgia also attributed constraints on food hub development to difficulties sourcing enough local products year-round and to coordination challenges among growers, prospective food hub managers, and buyers (Munden-Dixon et al., 2015). Institutional clients' limited awareness of food hubs in their communities can further restrict growth (Fournier et al., 2020).

Recruiting farmers can be challenging, as those committed to direct marketing and opposed to industrial agriculture may view hubs as conventional intermediaries to avoid (Rogers & Fraszczak, 2014). Others accustomed to large-scale distributors may be discouraged by the smaller volumes and perceived informality of food hubs. Conflicts can also emerge within hubs because smaller farms often prefer limited sales at premium prices, while larger ones seek higher volumes at discounted prices (Schmidt et al., 2011). Managing this diversity in farmer profiles and expectations increases workloads and the potential for conflict (Fournier et al., 2020; Jablonski et al., 2011). For instance, Motzer (2019) describes the tensions that arose in a Montana hub after new members were required to produce less profitable crops, which fostered perceptions of favoritism and exclusion. Hubs can also strain relations with nonparticipating farmers who may view such platforms as competitors for markets (Motzer, 2019; Perrett & Jackson, 2015).

Another obstacle is that farmers may prioritize direct sales over hub deliveries, with one study finding that even highly committed producers used hubs mainly to sell surplus produce (Furman & Papavasiliou, 2018). Farmers also struggle to balance the product diversity required for direct-to-consumer sales with the higher-volume specialization expected by food hubs.

The literature identifies additional challenges for both participating farmers and clients. For instance, producers face tight deadlines for harvest and delivery, uncertain order volumes, and concerns over the loss of individual brand identity and connections to clients (Cleveland et al., 2014; Schmidt et al., 2011; Thompson & Stinnett, 2018). Farmers also report low prices (compared to direct sales) and low volumes (compared to conventional chains), particularly in hubs that balance fair pricing with social missions (Cleveland et al., 2014; Conner et al., 2018; Hoey et al., 2018; Rutz et al., 2018).

As mentioned, farmers who join a food hub are often required to sign noncompete clauses, which can create tensions with managers. For established growers in the Montana food hub analyzed by Motzer (2019), this restriction meant relinquishing previously held retail accounts, including profitable or long-standing ones, although the article does not specify whether this applied to retail accounts not served by the hub. Less-established

producers in the hub also viewed these restrictions as potentially limiting the growth of their businesses. In Georgia, a manager even concealed the identity of institutional clients to prevent participating farmers from bypassing the platform and selling directly (Furman & Papavasiliou, 2018). Such conflicts can ultimately undermine the cooperative, noncompetitive relationships on which food hubs depend.

Institutional buyers commonly cite constraints such as limited product availability, seasonality, and their own insufficient storage, which can constrain their ability to increase purchases from food hubs. Similarly, delivery schedules can be inconvenient, and institutional clients with limited staff available for processing may struggle to accommodate larger volumes of produce when food hubs do not provide processing services (Conner et al., 2020). Seasonality itself often leads to demand fluctuations that hubs may struggle to navigate, such as when schools close for holidays (Fournier et al., 2020). Collaboration is also constrained because public and semi-public institutions often face budgetary restrictions, contract requirements, and bidding processes that can be difficult for food hubs and producers to manage (Conner et al., 2020; Schmit & Severson, 2019).

Food hubs serve both large and small institutional clients, and each category offers distinct advantages and limitations. Serving large buyers can reduce delivery frequency and transport costs, but it can also force hubs to compete with conventional distributors (Cleveland et al., 2014). Moreover, reliance on a small number of large clients can lead to dependency issues. These relationships can also be unstable, as contracts with schools, hospitals, and other public institutions frequently depend on time-limited public funds (Fardkhales & Lincoln, 2021). Meeting the production, handling, processing, and storage standards of such buyers poses another barrier, especially for smaller hubs (Schmit & Severson, 2019). By contrast, smaller customers, such as restaurants, specialty stores, and childcare centers, typically impose fewer requirements and allow hubs to diversify their revenue sources. However, managing numerous small deliveries can increase costs and operational complexity (Rutz et al., 2018).

Other barriers to hub growth include unstable external funding that can undermine long-term planning (LeBlanc et al., 2014), as well as shortages of infrastructure, including trucks, warehouses, processing facilities, and IT capacity. For example, many hubs depend on volunteers rather than IT professionals to build websites, which can result in technical issues and lost sales, while the absence of electronic payment systems can create cash flow delays when customer payments are late (Jablonski et al., 2011).

Human-resource constraints can further weaken performance. As noted by Entsminger (2020), founders of start-up hubs often lack management experience or a clear understanding of how hubs should function, reflecting a broader scarcity of accessible information and best-practice guidance (LeBlanc et al., 2014). Reliance on volunteers can also be risky due to differences in reliability and skill levels (LeBlanc et al., 2014).

Financial viability depends heavily on achieving sufficient sales volumes. Rysin and Dunning (2016) estimate that annual sales of approximately US$800,000 are required to break even, while Fischer et al. (2015b) place the threshold at US$600,000. Profitability also reflects expenditure patterns. Unprofitable hubs devote twice the share of revenues to overhead costs, reducing the amount available for product purchases, while profitable hubs spend around 15% on personnel and 70% on farm products, a distribution similar to that of conventional distributors. In unprofitable hubs, payroll consumes a larger share of expenditures, creating a cycle of low purchasing capacity and stagnant revenues (Fischer et al., 2015b; Rysin & Dunning, 2016).

Population density constitutes an additional barrier to growth. According to Cleary et al. (2019), a minimum population of about 182,000 residents is necessary to sustain a hub, as additional hubs can dilute revenues and undermine the viability of existing platforms. This suggests that external support and funding can unintentionally foster oversaturation, underscoring the need for coordinated growth to prevent duplication by multiple hubs offering identical services (Fournier et al., 2020). Cleary et al. (2019) also note that higher levels of social capital reduce the minimum population

threshold for profitability, indicating that hubs are more viable in communities with strong cohesion and public support for local agriculture.

Discussion and Conclusion

This study contributes to scholarship on local food systems by examining the organization of food hubs, their legal structures and objectives, the benefits they provide to farmers and communities, the financing mechanisms that support them, and the challenges they face. By synthesizing the evidence base to date, our findings can inform the development of policies and practices to support the growth of such platforms. In addition, the review offers insights into where further research is needed to advance our understanding of the role of hubs in building resilient and equitable food systems.

Our findings suggest that food hubs have the potential to strengthen local food systems but face persistent obstacles to long-term sustainability. For instance, they demonstrate an ability to adopt diverse marketing and organizational arrangements based on local contexts and are often motivated by both economic and social objectives. Participation in hubs also provides documented benefits for farmers and agricultural regions. At the same time, growth is constrained by difficulties in recruiting and coordinating farmers and stakeholders, the demanding requirements and unstable purchasing patterns of institutional buyers, and challenges in generating the sales volumes needed for financial viability.

As highlighted in this review, debates over external funding feature prominently in the literature, and their policy implications warrant attention. Most researchers ultimately stress the need for pragmatism, arguing that long-term funding should not be equated with failure, given the multiple objectives food hubs often pursue. As illustrated by the case study from France (Fournier et al., 2020), funding may also serve as an instrument of public control, underscoring the political dimensions of external assistance for food hubs.

Food hubs that receive financial support should document their outcomes to maintain transparency and public trust. This can be achieved through periodic performance evaluations, which enable midcourse corrections and the efficient use of resources (Nelson & Landman, 2020). While setting multiple economic and social objectives is not inherently problematic, hubs should avoid overcomplicating operations and engaging in mission creep, particularly when resources are limited (Hoey et al., 2018).

Beyond the question of external funding, another debate concerns whether food hubs challenge or reinforce existing food systems. Some critics argue that food hubs are not transformative but instead maintain the status quo (Perrett & Jackson, 2015). Direct-sales channels, by contrast, are explicitly designed in opposition to conventional modes of production and distribution. According to this perspective, food hubs are simply mechanisms for improving value chains and providing farmers with access to new markets at competitive prices. A counterargument is that food hubs, given their function as intermediaries, should not be judged by the same standards applied to direct marketing. Moreover, as growth in direct-to-consumer sales slows (O'Hara & Benson, 2019), food hubs represent a complementary strategy for expanding market opportunities for small- and medium-sized producers, while also supplying institutions with local food.

Appraising food hubs also requires consideration of their nonmonetary impacts, including the relationships they foster among supply-chain stakeholders (Cleveland et al., 2014). As Rogers and Fraszczak (2014) note, hubs operate as more than market intermediaries; they create spaces where farmers, staff, and institutional customers can meet, exchange perspectives, and develop trust, although the literature also notes that these relationships, at times, can become strained. For farmers, participation not only facilitates the sharing of professional challenges and peer learning but also reinforces a sense of belonging to a collective effort (Motzer, 2019).

Our findings also point to possible directions for the future evolution of food hubs. First, food hubs could develop more explicitly as regional platforms rather than solely as intermediaries for aggregation and distribution. This would involve adopting stronger systems for demand forecasting and crop planning, staggered production, expanded

processing capacity, and even coordination among multiple hubs or shared infrastructure, particularly where localized production, institutional purchasing requirements, and limited resources constrain individual hub growth. Second, food hubs could further develop the relationship-based and transparent forms of intermediation already adopted by some hubs, while continuing to centralize logistics, invoicing, food safety compliance, and delivery. These practices include co-branding, showcasing farm profiles, buyer-producer meetings, and platform-based ordering systems that make participating farmers more visible to institutional clients. Such arrangements could combine the efficiency of intermediated aggregation and distribution with the closer producer-buyer relationships that characterize direct marketing channels.

One limitation of our review was the exclusion of gray literature. While this choice is permissible under rapid review protocols (Tricco et al., 2015) and helped maintain a focus on peer-reviewed sources, it may have excluded practical insights from the field that are not captured in the academic literature, including more recent National Food Hub Survey data. Future reviews would therefore benefit from incorporating gray literature sources to capture a broader range of perspectives, as well as more recent data.

Looking ahead, several research gaps also warrant attention. First, racial equity remains underdeveloped in peer-reviewed food hub research. Although some studies in our sample briefly touched on related issues, including support for minority farmers and underserved communities, few examined racial equity as a central analytical focus. Future research should therefore examine how food hubs engage with racialized communities and minority farmers, and whether they address or reproduce inequities in food systems.

A second gap concerns the limited scholarly attention given to food hubs involved in meat processing and distribution. The regulatory and infrastructure demands associated with such hubs suggest that their operations differ in important ways from conventional produce-focused hubs. Accordingly, a fuller understanding of hubs specializing in meat products would broaden the empirical base of food hub scholarship and inform policymaking in a sector where small- and medium-sized livestock producers often face significant barriers to market access, including limited slaughtering and processing facilities (Syukron & Su, 2023).

Another area requiring attention is organizational diversity. While nonprofit food hubs receive the bulk of scholarly attention, over half of U.S. food hubs operate as for-profit or hybrid entities (Fischer et al., 2015a). Consequently, more work is needed to understand how for-profit hubs differ from their nonprofit counterparts in terms of structure, funding, and community impact. Such research would shed light on which organizational models best support economic viability and social objectives.

Future research could also examine how prices charged by food hubs compare with those of conventional distributors. Such comparisons would need to account for differences among institutional clients, including whether food is resold to end consumers through restaurants or specialty grocery stores, or served in settings such as schools and hospitals, where consumers may not pay directly for the food. Finally, as our results show, research on food hubs remains concentrated in the U.S., which limits understanding of how such platforms function in other geographic and cultural settings. Documenting such cases would clarify the potential of hubs to strengthen local food systems in other industrialized countries, while also expanding the evidence base needed for designing policies tailored to local contexts.

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