FRC Food Policy Summary Paper

Best practice in local food systems logistics: Summary of US research

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Introduction

The people who work getting local food to customers (farmers, food hub operators, retailers) face a shrinking UK market, increasing fuel prices and a lack of capital. Dealing with these challenges means local food businesses have to work hard. Logistics, of course, play a crucial role.

In 2018, academic journal Sustainability published a paper by Dr Anuj Mittal, Caroline C. Krejci and Teri J. Craven. The paper, called "Logistics Best Practices for Regional Food Systems: A Review", is a summary of previous research on logistics for local food systems.[1] The summary is predominantly focussed on North American contexts, where there has been a lot of research. While there are differences between local food systems in the US and UK, notably in scale and funding of the sector, some of the best practice tips it suggests may be transferrable to the UK context. By surveying all of the North America-focused research and some papers from Europe and Mexico, it collects many insights for people working in short, local food supply chains. The aim of this report is to bring the paper's key findings to the UK in a convenient, accessible format and see what could be learned from the extensive research that has been done on short supply chain logistics in North America.

Key Findings

1. Collaboration between food hubs has the potential to reduce operational and overhead costs across transportation, warehousing and inventory management logistics.
2. Ensuring food traceability can add value to products and help local food supply chains differentiate themselves.
3. Third Party Logistics could be cheaper than investing in infrastructure development.

Things we don't know enough about yet:

1. How to tailor logistics best practice to different situations and places.
2. There is no framework for successful food hub collaborations yet.
3. Many of the proposed solutions are economically out of reach and there is a lack of research on cost-effective strategies for implementing technology-based best practices.
4. It is difficult to make logistics management decisions; and there are not enough decision support tools.

Transportation

Efficient Vehicle Utilisation

The research recommends using:

a. routing software for route optimization;
b. Global Data Synchronization (GDS) to maximize load rates.

However, software can be expensive. An alternative would be a basic program that plans efficient routes, rather than a complex interactive model. If affordable software is unavailable, food hubs could create simple guidelines. For example, food hubs could plan their deliveries according to seasonal supply and focus on serving nearby customers when supply is low, in order to run cost-efficient routes with fully-loaded trucks as much as possible. A hub could also require customers to pick up at conveniently located distribution sites.

In Practice: "Bix Produce, a regional food distributor in Minnesota, uses two different routing systems to create efficient routes. Bix's routing system creates an initial set of fixed routes, and a UPS Logistics Technologies system fine-tunes those routes based on the actual loads and specific stops."

In Practice: "Full Circle, a food hub in Washington, divided its delivery area into three regions and supplies its customers with products from farmers located within the customers' region."

In Practice: "New North Florida Cooperative in Marianna, Florida, cultivated a customer base within a specific geographic region to establish economically-efficient delivery routes The cooperative also makes efficient use of truck capacity by pairing deliveries to high-volume/low-price customers (e.g., grocery stores) with low-volume/high-price customers (e.g., schools)."

In Practice: "The Iowa Food Hub, located in West Union, Iowa, offers hauling services to its producers, in addition to transporting their products to the hub's warehouse. By providing this additional service, the truck is filled with a more complete load and receives additional income from charging hauling fees to producers. Similarly, Potato King, a produce wholesaler and transporter in Wisconsin, maximizes the loads on its trucks by providing a hauling service for regional companies that have shipments to be delivered near Potato King's existing customers on its established routes."

Backhauling

The paper suggests food hubs and producers incorporate backhauling to reduce transportation costs.

Implementation is challenging, because backhauling requires a lot of coordination and planning. It is easier when:

a. routes are consistent;
b. you have one major customer.

Some FHs have extended their delivery reach by backhauling with other distributors and retail stores.

In Practice: "An innovative and efficient distribution model, known as the Farmers' Market Hub, was proposed to increase regional food access for customers in the Greater Los Angeles area. With this model, products from multiple farmers would be aggregated at the farmers' market. Before returning home from the farmers' market, the farmers' empty trucks would be filled with the aggregated product, which would be used to fulfill wholesale orders in their respective regions."

Vehicle Selection

The paper suggested that food supply chains consider:

a. vehicle options such as mobile carts, renovated postal vans, and multi-modal options such as train or boats;
b. a hybrid strategy, in which some vehicles are purchased and others are leased. This can provide flexibility without significant capital investment. For example, a food hub could lease additional vehicles as a supplement to its purchased fleet during busy seasons;
c. the appropriate vehicle size. This should be based on the maximum load requirements during the peak season. This is an important decision, because fuel efficiency differs

significantly for different vehicle sizes;
d. purchasing vehicles that are common in the area, so that replacement parts can be obtained quickly.

In Practice: "Co-op Partners Warehouse, a regional organic food distributor based in St. Paul, Minnesota, transports products from its warehouse to its customers using one leased truck and six self-owned trucks. The leased truck is used for daily deliveries to its biggest customer, which mitigates risk: The leasing company is obligated to provide a replacement truck if a mechanical problem occurs, so this critical route will always be covered."

In Practice: "Capay Valley Farm Shop in Esparto, California, decided to purchase (rather than lease) its two refrigerated box trucks to avoid lengthy trips to the leasing agency for maintenance."

On-Time and Frequent Deliveries

On-time and/or frequent deliveries are important.

A survey from upstate New York showed 33% of customers would increase their purchases if the food hub increased product variety, provided more frequent deliveries, and reduced the time between order placement and delivery.

Restaurant owners are more likely to use a food hub if the hub is highly responsive and offers frequent deliveries.

In Practice: Co-op Partners Warehouse offers daily deliveries of small volumes, which has attracted restaurants and has helped them differentiate themselves from other organic food distributors in the area. They also deliver on Sundays and offer "short delivery calls" for in-town customers, in which orders received by 10:00 a.m. can be delivered the same day for no extra charge.

Third-Party Logistics (3PL)

The paper suggested that local food supply chains consider 3PL because in some cases, 3PL services may be less expensive than in-house distribution. It is recommended that food hubs accurately calculate and compare in-house distribution costs with 3PL fees.

3PL is especially recommended for food hubs that are in the process of establishing themselves, because they can help in the process of developing your own transportation and distribution network.

To increase its delivery radius, an organisation can use in-house distribution to deliver to nearby customers and hire a 3PL provider for more distant deliveries.

In Practice: "Good Earth Farms, a producer in Wisconsin, uses a combination of a national parcel service and a regional delivery service for its products."

However, local food supply chains should be aware that 3PL can:

a. be more costly;
b. have longer delivery times;
c. reduce food traceability.

Transportation Collaboration

The paper suggests collaborations across local food supply chains.

Producer-Producer collaboration is particularly useful to:

a. reduce costs;
b. mitigate risk through shared benefits and losses;
c. access processing facilities;
d. reach new markets.

For example, producers could collectively invest in a shared delivery truck.

In Practice: "By sharing trucking with another company for their long hauls, Eden Natural, a pork producer in Iowa, saved $0.08 per mile in transportation costs, an annual savings of over $25,000."

The drawbacks to Producer-Producer collaborations could be:

a. needing to introduce a traceability system such as farm-level labelling;
b. an increase in business risk;
c. slow decision-making.

The paper recommends drawing up a contract specifying the responsibility of each involved party; and sharing information between organisations for transparency, whilst avoiding sharing too frequently or sharing irrelevant information.

Food hubs can use their vehicles to offer producers an additional 'drop-shipping' service. This is a further collaboration between food hubs and certain producers where the food hub delivers producers' products directly to customers for a fee. The produce does not pass through a physical hub space. The producer is able to sell directly to wider markets and the food hub receives extra revenue.

In Practice: "Co-op Partners Warehouse developed a drop-shipping program for small producers, allowing them to sell their products directly to customers but have Co-op Partners Warehouse make the deliveries. Co-op Partners Warehouse fits the drop-ship deliveries into its regular delivery schedule and bills the producer for the service."

Warehousing

Effective Labour Utilisation

Employee training, workload balancing and appropriate staffing can reduce staff turnover.

In general, research indicates that high-performing hubs pay their employees more. The performance benefits from a motivated and loyal workforce tend to outweigh the costs.

In Practice: "Much of the success of La Montanita Food Co-op can be attributed to recruiting the right combination of skilled and experienced warehouse staff. Their staff members have extensive backgrounds in warehousing, delivery, management, and operations."

"By contrast, one of the greatest challenges faced by Co-op Partners Warehouse, a Minnesota-based distributor of organic products, has been a lack of experienced staff. Their management also suspect that a lack of professionalism in the warehouse's work culture has contributed to lost business opportunities."[2]

Facility Location

Food aggregation facilities should be located near major transportation routes to tap into external freight transport systems and leverage existing transportation infrastructure. A strong customer base can also justify selecting an aggregation site that is further from producers.

Infrastructure Development

A food hub should use its storage space and not invest in capacity that it does not have plans to use. While allowing for future growth or expansion, the size of a food hub's warehouse should be based on:

a. projected peak season weekly kilos. To determine this value, a hub should frequently monitor its space and equipment usage (e.g. the proportion of space occupied in cold storage each week);
b. the acreage of the supplying farm (e.g. 0.5m2 storage per acre of farm).

Small investments can have substantial benefits, e.g. new or improved loading docks, pallet lifters,

forklifts, banding and wrapping equipment can reduce labour costs and speed up operations.

Paying to access existing supply chain infrastructure can reduce up-front investment costs

In Practice: "A local food distributor in Vermont had its producers dip their eggplants in ice water before loading them on the truck to reduce spoilage. This eliminated the need for investing in a refrigerated truck."

Warehousing Collaboration and Resource Sharing

Producers could purchase packing materials as a group; and share storage facilities to reduce warehousing costs in the post-harvest season.

Food Hubs could lease warehouse space to other organisations to generate additional revenue;[3] or pay to use the existing distribution infrastructure and cross-docking services of food banks.

In Practice: "In a survey of 143 food hubs in the U.S., more than half (52%) reported that they were engaged in either a formal or an informal collaboration, and several had increased their revenues by renting space to other businesses in their region."

Inventory Management

Warehouse Inventory Management Systems

A good inventory management system will keep track of which products are:

a. in stock;
b. on order;
c. on backorder;
d. sold to customers.

and support first-in-first-out inventory control.

Food hubs can use either:

a. an Excel-based inventory management system. This is highly dependent on manual data entry;
b. an Enterprise Resource Planning (ERP) system. This automates data exchange as transactions are performed.

In Practice: UK-based food hubs in the Better Food Traders network use Quickfile (which is free to use), Xero, Kashflow, and Quickbooks.

In Practice: "Ecker's Apple Farm in Wisconsin currently records its inventory transactions on paper and transfers this data to QuickBooks, with an eventual goal of adopting inventory management software and eliminating manual record keeping"

In Practice: "Oklahoma Food Cooperative uses Local Food Cooperative Software, an open source platform. Though the software make some assumptions on the operational structure of a food hub like weekly delivery cycle, it acts as a cost-effective option for the food hub, especially in their starting phase"

In Practice: "Greenmarket Farmers Markets in New York used QuickBooks to manage orders and inventory in the initial phase of the business's development but then switched to software designed by Food Connex."[4]

Inventory Tracking and Food Traceability

Providing information about the origin of products can add to their perceived value.

Inexpensive tools like MS Office can be used to develop applications for tracing products.

The Leopold Center for Sustainable Agriculture published a how-to guide with step-by-step instructions for tracking inventory using QuickBooks.[5]

Some customers want precise information on: production methods; agrochemical treatments; breed of animal; transport and storage methods; harvest date; and number of hands through which the product has passed.

One method of inventory tracking is the use of barcodes or tags such as Radio-frequency Identification (RFID). While RFID tags are more expensive than printed barcode labels, RFID can be more efficient, because the tags do not need to be visible to be scanned, and multiple items can be scanned at once. Items tagged with RFID systems can be tracked without a human actually checking them and customers can use them to access information about their provenance.

However, producers can provide this information to their customers without scanning technology by adding information about their products on signage, cases, and Price Look-up (PLU) codes.

Implementing inventory tracking systems can be costly and inconvenient for producers. Aggregators could incentivize participation in tracking systems by offering long-term contracts.

In Practice: "Grass Run Farms and Edina Couriers have both implemented electronic scanning and software systems to track the movement of their products and to provide other supply chain members with accurate inventory data. However, Grass Run Farms found that consumers did not value QR codes enough to justify the cost of implementation."

In Practice: "Red Tomato maintains product traceability by allowing apples from only one producer in each tote, along with the name and description of the farm. By contrast, Bix Produce knows from which two or three farms each product originated and provides customers with information on all of these farms to consumers, thereby maintaining farm identity but avoiding overburdening their operations. Appalachian Harvest addressed this issue by building a single brand that represents all of their farmers and farming methods, rather than maintaining individual farmer identities."

Demand Forecasting

According to the responses to two US food hub surveys, matching regional food supply with demand is the most common limiting factor for food hub growth.

Therefore, the paper recommends food hubs have a detailed understanding of supply and demand across their region.

The paper suggests that food hub managers should conduct pre-season crop planning with both buyers and producers to match supply and demand throughout the season. Ideally, food hub managers should have a core group of dedicated producers that participate in crop planning, as well as relationships with a broader range of producers to help fill in any gaps caused by unplanned events.

Setting up informal intent-to-buy agreements with buyers will yield standing orders that make demand patterns more predictable.

Food hubs and other regional food organisations can go directly to their customers to gather demand information: online surveys, tracking ordering habits, and speaking with customers about their needs.

In Practice: "Oklahoma Food Cooperative also surveys its customers to determine their preferences and then shares the survey results with their producers to support crop planning."

In Practice: "Common Market developed strong customer relationships with several school districts and hospitals that provide them with data on the volumes and types of products demanded by consumers."

In Practice: "Appalachian Harvest found that allocating 10–20% more supply than expected demand was a good strategy, since some producers do not meet their production projections."

Processing Produce

Processing and preserving foods by freezing, canning and drying can ensure producers and food hubs have a consistent supply. Processed food is also convenient and appealing to many buyers—it is easy to store, ready to use, and less perishable than fresh products.

Processed food products can raise a better price for farmers and increase the utilisation of cosmetically imperfect food products.

Collaboration and Resource Sharing for Inventory Management

Food hubs can reduce their inventory management costs by:

a. sharing deliveries:
b. group purchasing:
c. purchasing pooled insurance policies.

Food hubs benefit from keeping their inventory levels low and ensuring rapid inventory turnover because they have limited cash flow. However, the high level of coordination that is needed to support Just-In-Time deliveries requires significant information sharing between producer and food hub, which can be challenging if they are competitors.

In Practice: "Stonyfield Farm, a dairy company in New Hampshire, has benefited from collaborating with Organic Valley to aggregate and process organic fluid milk. Both companies jointly market the milk, and Wisconsin-based Organic Valley benefits from Stonyfield's strong brand presence in the Northeast region."

In Practice: "Grass Run Farms manages its inventory using Excel spreadsheets and has been able to reduce its week-to-week inventory to just a few boxes of product."

In Practice: "Walsma and Lyons and Sysco Grand Rapids, two food distributors in Michigan, regularly visit producers to learn about their operations and to build trust. Over a three-year period of building relationships, they have doubled the amount of regional produce that they distribute, and they have helped producers expand their delivery reach."

Conclusion

This summary collates US experiences of solving supply-chain logistics challenges in short, local or regional supply chains. Some of the solutions proposed will be out of reach of many UK food hubs on the grounds of cost, and some may not be applicable in the UK context because policy supports and supply chain norms are different.

Two lessons emerge:

First, there is a lack of equivalent, systematic research based on UK experience that can be shared among UK hubs.

Second, the fact that so many hubs are beset by financial and logistical problems, with technological solutions in particular seeming out of reach because of lack of resources, indicates how unbalanced our food system is. On one hand are the large-scale, consolidated retail- or food-service-led supply chains, and on the other a patchwork of under-resourced, small-scale hubs and producers.

Both policies and technical solutions are needed to encourage and enable the kinds of infrastructure that can support short, local, seasonal and fair supply chains.

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