

MAPPING AND ANALYZING THE NETWORKS AND SUPPLY CHAINS FEEDING A FOOD DISTRICT IN LONDON, CANADA

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Abstract: In a world where the food we eat is often grown half way around the world, what does it mean when a vendor at the neighbourhood farmers' market says that they use local food? Small businesses are important actors in the food industry, since they are small enough to quickly respond to changing consumer demands and market trends. However, often in order to meet customer demands, they need to challenge and work around the conventional system of food provision. Primary data was gathered using semi-structured interviews with small food business owners. Foodshed analysis was used to describe and analyse the alternative and conventional food supply chains and networks of a food district in a mid-sized Canadian city. The small businesses interviewed source food from a large number of local farmers; however, the foodshed is largely dominated by the Ontario Food Terminal in Toronto, Canada's largest city. A limited number of regional distributors provide small businesses with access to locally grown food and an alternative to the produce terminal. This research reveals the distances and suppliers to which the supply chain extends, as well as complex ways in which supply chains of different businesses overlap. The diverse, interconnected and relational nature of the food system has important implications for food and local economic development policies for both urban and rural regions.

1. Introduction

Local food has experienced a resurgence in recent years with the proliferation of farmers' markets and artisanal food producers who are competing in an industry dominated by large multinational agri-businesses and retailers. Small businesses are important actors, since they are small enough to quickly respond to changing consumer demands and market trends (Donald 2008). In order to meet these customer demands, however, small businesses often need to challenge and work around the conventional food system. The purpose of this paper is to describe and analyse the food supply chains of a local food district in London, Ontario, a mid-sized Canadian city. The paper begins with a review of the literature on conventional and alternative food networks, and the analysis of foodsheds, food networks and supply chains, which provides the basis for our study objectives. Following an outline of the study area and methods, results of our analyses are presented and a discussion of the findings. The diverse interconnected and relational nature of the food system has important implications for the development of food and local economic development policy for both urban and rural regions.

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2. Review of Literature

2.1.1 Globalization of Food Systems

The 'conventional' food system today is characterised by large scale, industrial farming and agricultural practices, complex global supply chains dominated by a few multinational agri-business companies and retailers (Hendrickson & Heffernan 2002; Winter 2003). As seed and chemical companies and food retailers have gained oligopolistic power in the food supply chain, they have used this power to force shrinking margins on agricultural producers (Hendrickson & Heffernan 2002). This pressure has led producers to increase production in order to compensate for shrinking margins as farmers were encouraged to 'get big or get out'. Consolidation has occurred at all stages of the supply chain as the number of small and midsized farms continue to decline (Statistics Canada 2012), and local abattoirs and other small scale producers are going out of business or being bought up (Carter-Whitney 2008). Large agri-businesses and retailers are based on complex, globalised distribution systems which are inaccessible for small and medium sized farmers and producers.

2.1.2 Local / Alternative Food Systems

The term alternative food networks is problematic since it is defined by what they are not and "tend[s] to be employed as a universal term, to denote food systems that are somehow different from the mainstream" (Tregear 2011, p.423). This is problematic since it creates an ambiguous term which is then applied to a wide range of food systems, with a wide range of objectives, including: reducing the number of intermediaries by encouraging direct farmer-consumer relationships, organic or ecologically grown food, food grown and consumed locally, food grown in socially just ways, or food grown in specific localities using traditional farming techniques. Each of these food systems have different values, priorities and motivations that underpin them, and as a result have very different impacts and outcomes. Often these food systems are positioned along three dimensions of alternativeness: the qualities of the food (Goodman 2004), the characteristics of the networks through which the food moves (Renting et al. 2003; Watts et al. 2005) and the locality where the food was produced.

Food systems based on providing high quality food, such as the organic industry, have been criticised for being susceptible to being co-opted by the industrial food system (Watts et al. 2005). In response a greater focus developing stronger networks through which food is transported has been proposed as a 'stronger' alternative which can resist being co-opted. These networks are typically exemplified by bringing farmers and consumers closer together with fewer intermediaries (Feenstra 1997). These direct relationships are argued to allow, among other things, for beneficial social relationships and trust to develop between consumers and farmers, and improved economic viability of farming and small food businesses (Holloway & Kneafsey 2000; Jarosz 2008; Sadler et al. 2013). Value based supply chains and short food supply chains are two more concepts which have been proposed to differ from conventional supply chains based on a number of dimensions, including degree of cooperation, trust, transparency, and a commitment to the welfare of all participants in the supply chain (Marsden et al. 2000; Renting et al. 2003; Severson & Pirog 2008; Bloom & Hinrichs 2010). It is suggested that if relationships and networks are based upon these values they will be harder to co-opt and will be able to drive significant change and retain their alternativeness.

The 'local' has long been a scale that was considered to challenge the conventional food system by bringing farmers and consumers together and providing social, economic and environmental benefits

(Feenstra 1997). However, the tendency to romanticize the local or use it in an exclusionary and discriminatory way has been criticized since it is false to assume that any scale is by default more socially, environmentally or economically just (Hinrichs 2003; DuPuis & Goodman 2005; Born & Purcell 2006). The push towards localization may even exacerbate local and regional inequalities between localities (DuPuis & Goodman 2005; Feagan 2007; Tregear 2011).

The universal criticism of these attempts to define the 'alternative' is that there is a tendency to dichotomize the food system into two opposing options, an alternative and a conventional system. Instead, there is a need to better understand the complexities of the food system and the ways in which the alternative and conventional overlap and intertwine (Sonnino & Marsden 2006; Bloom & Hinrichs 2010; Tregear 2011).

2.1.3 Analysing Foodsheds, Networks and Supply Chains

The concept of a foodshed was first proposed by Walter Hedden in his book *How Great Cities are Fed* (1929). Hedden first conceived of the term foodshed while considering where all the food eaten in New York City came from. A key component was the network of terminal markets which aggregated and moved food around the continent. It was not until Author Gertz (1991) reintroduced the concept to describe regional food systems that the term became commonly used. Since then, foodshed analysis has tended to: (1) determine the *potential* for supplying an urban area from the local foodshed by measuring net consumption and production (Peters et al. 2008; Kremer & DeLiberty 2011); (2) study large scale international trade (Billen et al. 2011); or (3) focus exclusively on the local food system (Kremer & DeLiberty 2011). It is argued here that foodshed analysis techniques which incorporate spatial analysis and network analysis can offer valuable insights into how the current alternative and conventional food systems interact, as well as showing the potential for growing the alternative.

While foodshed analysis inherently implies a spatial component there are parallels with studies of food supply chains and food networks. Ilbery and Maye (2005) note the interaction between local and global supply chains in their investigation of specialist livestock products. Ter Wal and Boschma (2008) argue for the potential of social network analysis to contribute to economic geography and gain a better understanding of clusters, regions and formal networks. Consequently, social network analysis has recently been applied to studies of food systems where there is an easily defined and contained population of actors (Chiffolleau & Touzard 2013; Christensen & O'Sullivan 2015). These types of networks, however, are limited in their applicability, since most food systems are not closed and are always influenced by outside actors. Network analysis and supply chain analysis have been criticised for solely focussing on either horizontal or vertical connections respectively, while ignoring the other (Lazzarini et al. 2008). This paper will use foodshed analysis combining spatial and network analysis of alternative and conventional supply chains used by small businesses.

2.2 Relevance and Objectives

2.2.1 Objectives

The objective of this study is to demonstrate the use of foodshed analysis techniques to investigate the supply chains and networks used by small businesses in a food district. This aims to incorporate

the experiences of small food business owners, typically a difficult to access group of actors, into a fuller understanding of the open and diverse food systems used by businesses.

Analysis will focus on a case study of a food district in the city of London, Canada to determine where the food comes from that is used by small businesses and how networks vary between businesses within the food district. Businesses in the food district exhibit varying degrees of 'alternativeness', however they are all independently owned, small businesses which differentiate themselves by offering 'quality food'.

2.2.2 Impact and Relevance

It is argued that the foodshed analysis techniques described below are valuable for academics, planners, and policy makers to gain a better understanding of the opportunities and challenges in growing local food networks. This has important implications for local economic development initiatives in both urban and rural contexts. In particular, these techniques can provide new methods of evaluating policy changes and local economic development initiatives in the food system. Additionally, the case study provides further evidence of the misconception of distinct 'local' or 'alternative' food systems, as well as the need to think regionally, across local and regional political boundaries when considering the implications of food system policies and initiatives.

3. Study Area & Background

3.1.1 City of London, Canada in South Western Ontario (SWO)

This study was conducted in London, Ontario, a mid-sized Canadian city (population 366,151 in 2011), located approximately halfway between the major urban centres of Toronto and Detroit. London is also the largest municipality in the agriculturally fertile SWO region. The region's farms produce \$6.1 billion of farm outputs, which accounts for over half of Ontario's farm outputs, and including related industries, represents 11.4% of Ontario's GDP (Econometric Research Limited et al. 2015). The food and beverage manufacturing sector in the is comprised of large multi-national firms such as Cargill Canada, McCormick Canada, Labatt Breweries of Canada, Maple Leaf Foods, among others (Ontario Food Cluster 2015). Prominence of the food sector has increased recently with the decline of the North American auto manufacturing sector.

Agriculture in the SWO region is heavily focused on the global commodity crops of Corn, Soybeans and Wheat. Table 1 shows the breakdown of major crops in the region. Corn, soybeans and wheat account for 80% of total agricultural land. In contrast, field vegetables account for 2% of SWO's agricultural land, while fruits, berries and nuts account for just 0.4% (Econometric Research Limited & Harry Cummings & Associates 2014). Despite all this food production, Ontario is a net food importer. The only crops that Ontario is a net exporter of are Grain Products and Oilseeds, while Ontario net imports \$1.0B worth of vegetables (Econometric Research Limited et al. 2015).

A discussion of the SWO food system is not complete without mentioning the Ontario Food Terminal in Toronto. The food terminal brings together farmers, brokers, importers, exporters, restaurants, institutions and other buyers to exchange food. Collectively, the buyers at the food terminal are the largest buyer of Ontario produce in the province, and ranked in the top four terminal markets in North America with 2 billion pounds of produce distributed annually (Ontario Food Terminal Board 2015). The food terminal fulfils an essential role for the produce industry, making it easy and

convenient for sellers and purchasers to meet in the largest urban centre in the country. Many products grown in SWO are shipped to the terminal, sold there, and then shipped back to the region to be consumed. In this context the local food movement in the region has largely focussed on cutting out that step of distribution system by either sourcing directly from farmers or through local distributors.

Table 1. Selected crops produced in SWO. Source: (Econometric Research Limited & Harry Cummings & Associates 2014)

Crop	Hectares	% of SWO Agricultural Land	% of Ontario's Production
Soybeans	608,793	32.9%	61.0%
Total Corn	544,023	29.4%	58.3%
Total Wheat	327,807	17.7%	66.5%
Total field vegetables	36,254	2.0%	69.1%
Total area of fruits, berries and nuts	6,570	0.4%	30.8%

3.1.2 The Old East Village Food District



Figure 1: Food businesses in The Old East Village Food District, by business type

The Old East Village is an inner city neighbourhood located immediately to the east of downtown London (see Figure 1). Like many North American inner city neighbourhoods it underwent a period of decline in the 1980s and 1990s, due in part to the growth of the suburbs and the decline of the North American manufacturing sector. This left the neighbourhood suffering from neglect with a lack of investment in properties and a struggling businesses district. The Old East Village and Downtown London were both identified as food deserts due to their low socio-economic status and lack of access to healthy and affordable food (Larsen & Gilliland 2008). The food desert began its rebirth as a food district in 2006 with the opening of the Farmers' and Artisans' Market at the Western Fair (Larsen & Gilliland 2009). The market itself brought approximately 47 new food vendors into the neighbourhood. The market not only provided access to healthy and affordable food to the neighbourhood, but also created opportunities for food businesses to grow and develop and is now a regional attraction which stimulates the local economy (Sadler et al. 2013). Since the market opened, 5 food businesses from the market have expanded to open stores and restaurants in the neighbourhood. In addition, 6 other new food businesses have opened or relocated to the Old East Village (see Table 2 for a summary of the food businesses located in the Old East Village Food District).

Table 2. Summary of businesses located in the Old East Village Food District by type of business, and by location inside or outside the farmers' market

Number of...	Inside Farmers' Market	Outside Farmers' Market	Total
Produce Retailers	10	3	13
Meat / Dairy Retailers	11	3	14
Prepared Food Retailers	18	5	23
Restaurants and Cafes	8	17	25
Total	47	28	75

As a result of this growth, the Old East Village Business Improvement Area (OEVVIA) has identified food as an economic driver for the local economy. Initiatives are under way to encourage the continued growth of food businesses. This research project aims to assist these initiatives by helping to understand the regional food system which the food district is linked to, as well as the opportunities and challenges facing small businesses in the food industry.

4. Methods

This study used semi-structured interviews with small business owners located in the Old East Village food district to develop a fuller understanding of the food district's foodshed.

4.1 Recruitment strategy

Interview participants were recruited using emails, phone calls and in-person visits to local food businesses. As part of a larger research project, businesses and farmers across SWO were sent emails which asked if they would fill out a survey and if they would be willing to participate in interviews for the research project. Businesses located in the food district who indicated a willingness to participate were approached in person or contacted via phone to schedule an interview. In addition, businesses

located in the food district who had not replied via email were contacted and asked if they would participate in an interview. The relationships identified by each interviewee helped identify additional key businesses in the food district. These businesses were then contacted to participate in an interview and further expand the map of the network. Interviews continued until there was a strong representation of different types of food businesses in the food district including: raw food retailers (produce, meat and dairy), prepared food retailers (bakeries), and restaurants and cafes.

In total, 24 food district businesses were approached to be interviewed. Interviews were held with 21 businesses and three declined to be interviewed due to time constraints. Table 3 below provides some basic descriptive features of the interviewee businesses.

Table 3. Description of businesses interviewed by business type, business age and primary business location in the food district

By Primary Business Type	Raw Food Retailer	Prepared Food Retailer	Restaurant / Café
# Interviewed	8	7	6
By Business Age	0-5 Years	5-10 Years	11+ Years
# Interviewed	7	9	5
By Primary Location	Inside Farmers' Market		Outside Farmers' Market
# Interviewed	12		9
By Market Niche	Artisanal / Higher Quality	Local	Healthy
# Interviewed	21	10	5

4.2 Semi-structured interviews

Semi-structured interviews were conducted with owners of small food businesses based on a series of open-ended questions. The interviews were comprised of two main sections, the first discussed the history, market niche and experience of the business in the food industry, and the second section involved describing the supply chains and partnerships used by the business. This paper focuses on the second section of the interview.

The aim of the interviews was to discover all supply relationships used by businesses, including local and non-local, and alternative and conventional. To ensure this, the terms 'local' and 'alternative' were avoided during interviews. Instead, the research project was described to interviewees as an investigation of supply chains used by small businesses. Interviewees were asked to identify all food supply, partnership and other relationships used by their business. Prompting questions were used to ask how relationships were developed, or why a particular supplier was chosen. When a distributor was identified, interviewees were asked if they knew where distributors sourced the food they supplied to the interviewee. If part of a network was unclear then follow up interviews were conducted with interviewees to clarify the names, locations, or the type of relationship with a supplier. In addition, interviewees were asked to identify businesses that they supplied food products to, and other businesses with whom they had partnered or turned to for advice.

4.3 Methods of Data Analysis

4.3.1 Foodshed Analysis and Visualization

Using the transcripts of each interview a list of suppliers (including where possible the suppliers of the suppliers), partners and customers were created for each business. These relationships were inputted into the social network analysis software NodeXL (Smith et al. 2010). Additional descriptive information for each relationship ("edge") was recorded, including: the type of relationship (partnership or supply) and, in the case of a supply relationship, the types of food products supplied and the importance and status of the relationship to the interviewee. In this way the network recorded both the horizontal ties between like-firms and vertical ties between producers and businesses at different stages of the supply chain (Lazzarini et al. 2008). Additional information for each business ("node") was also added, including: type of business, business age, address and coordinates of their primary location.

Descriptive statistics for businesses in the network were calculated including the numbers and types of suppliers and customers ("out-degree") as well as the number of farmers and distributors supplying a business. Visualizations are used to depict the network and allow for visual analysis of the organisations of the relationships. Visualizations of the network were also used to identify additional businesses that could be interviewed, as well as identify clusters or groups of businesses within the network.

4.3.2 Spatial Analysis and Mapping

The nodes and edges from the network were also imported into a Geographic Information System (ArcGIS 10.3, ESRI) and mapped to provide a clearer understanding of geographic clusters, groups and gaps in the network. In addition, the length of the edges was calculated to provide a proximate measure of the "food miles" that food travelled through the supply chain to reach a business or consumer.

5. Analysis and Results

5.1 Supply Chain and Network Analysis

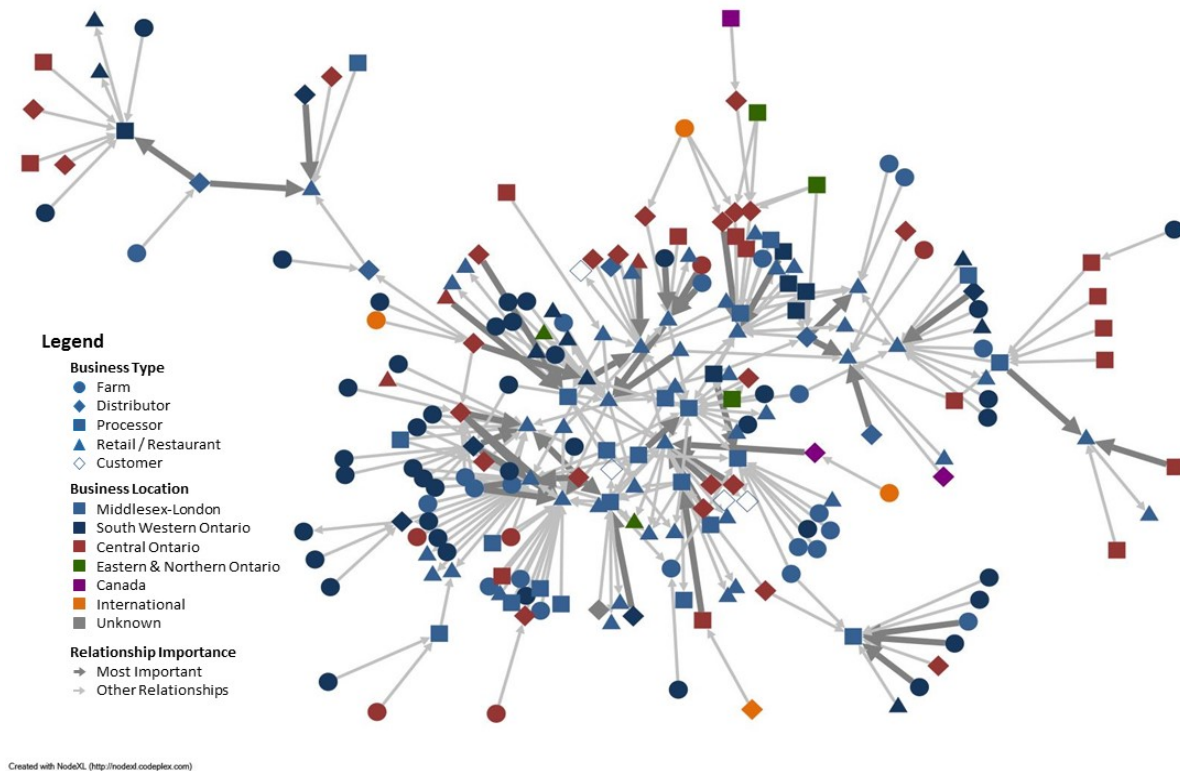


Figure 2. Food supply chain connections to the Old East Village Food District

The 21 businesses interviewed collectively identified 303 supply chain relationships with 221 businesses, farmers, businesses and locations (see Figure 2). The food network visualization was created in NodeXL (Smith et al. 2010) and groups connected points together, and pushes unrelated ones apart. Colours of the points relate to the region in which the business is located. The symbols refer to the different primary food system activities that a business was engaged in, and the darkness and thickness of the lines indicate the importance of the relationship. Based on the interviewees description of their supply relationships, the most important or critical relationship(s) were coded.

Figure 2 illustrates the differences in information availability and transparency of different food supply chains. In a perfectly transparent food system all supply chains would originate on a farm (indicated by arrows pointing out from a circle). However, it is the nature of our food system that businesses need year round consistent supply and rely on distributors who can import food from all over the world. In these supply chains, typically the only information about the food that is passed on to the consumer is the country or state of origin of the food. Supply chains that originate in a diamond or square, or any other shape indicate an instance where the interviewee only knew the distributor, processor or other type of business which directly supplied them with the food.

Table 4. Descriptive statistics of supply chain relationships for interviewees

	All (n=21)	Raw Food Retailer (n=8)	Prepared Food Retailer (n=7)	Restaurant / Café (n=6)
All Direct Suppliers				
Mean # of Direct Suppliers	10	14	7	8
Median # of Direct Suppliers	8	12	7	8
Minimum # of Direct Suppliers	2	3	2	5
Maximum # of Direct Suppliers	27	27	11	12
Direct Farm Suppliers				
Mean # of Direct Farmer Suppliers	4	7	3	2
Farmers as % of Suppliers	33%	46%	30%	20%
Businesses with No Farm Suppliers	5	1	3	1
Direct Distributor Suppliers				
Mean # of Direct Distributors	3	4	2	4
Distributors as % of Suppliers	39%	34%	39%	45%
Businesses with No Distributors	1	0	1	0

On average, businesses had 10 direct suppliers, 4 of which were farmers and 3 were distributors (see Table 4). In addition, 5 businesses interviewed did not source directly from any farms. Raw food retailers had the highest average number of suppliers (14), and one raw food retailer had the maximum number of suppliers (27) of any interviewee. These raw food retailers also had the highest average number of direct farm supplier relationships (7), and on average, farmers represented the largest percentage of their suppliers (46%). Raw food retailers also tied for the highest average number of distributors with restaurants and cafes (4). On average, businesses in the categories of restaurants and cafes and prepared food retailers had fewer suppliers, and also proportionally worked with more distributors and fewer farmers. Only 20% of the suppliers listed by interviewees from restaurants and cafes' were farmers, and 45% were distributors.

Table 5. Numbers of 'important' supplier relationships for interviewees with different types of suppliers

Number of 'important'...	All (n=21)	Raw Food Retailer (n=8)	Prepared Food Retailer (n=7)	Restaurant / Café (n=6)
Farm Suppliers	8	5	3	0
Distributors	25	11	4	9
Others (processors, retailers, etc.)	11	3	4	4
Total Important Suppliers	44	19	11	13

Interviewees tended to identify their most important relationships by either their largest food expense, most frequent delivery, or oldest relationship. Typically these relationships are the first ones that were mentioned, and only after prompting questions about other products were other relationships revealed. Distributors were much more frequently identified as important suppliers than farmers, and this was true across all business types (see Table 5). Food retailers identified 5 important farmers that they work closely with, however they also work with a large number of

distributors (11). Restaurants and cafes did not identify any farmers that were important suppliers and instead relied on 9 distributors.

5.2 Spatial Analysis

The businesses and relationships identified in the interviews were mapped and analysed using ArcGIS. If a business had multiple locations, then the primary location typically where production occurs, was used for the map. This spatial analysis deals only with the inter-firm relationships between two businesses, whereas the intra-firm supply chains between a business' multiple locations are not considered.

Figure 3 depicts the supply chains that bring food to the Old East Village Food District in London, Ontario. As is expected, many of the businesses are located nearby in London and surrounding Middlesex County. A large number of farms supplying businesses are located in the counties immediately adjacent to Middlesex, including Elgin (South), Oxford (East), Huron and Perth (North). There is relatively little food from counties southwest of London (Lambton, Chatham-Kent, and Essex). A large number of distributors from the west end of Toronto (Central Ontario) were identified near the Ontario Food Terminal, with others further north near the airport and the #401 highway. About halfway between London and Toronto, distributors and food processors and other businesses from the cities of Kitchener-Waterloo, Cambridge and Guelph (Central Ontario) had numerous connections to businesses in the food district. Businesses in the Old East Village Food District source food from as far away as California, South America and Europe.

Table 6 indicates where suppliers of the businesses interviewed were located. Among all interviewees, 22% of suppliers were other businesses located in the Food District, ranging from a high of 37% for restaurants/cafés to a low of 14% for raw food retailers. Further, 46% of direct suppliers were located within London-Middlesex, another 28% were from the rest of SWO, and 22% from the Central Ontario region around Toronto. This indicates where the businesses providing the food are located, not necessarily where the food itself was grown or raised, since many suppliers are distributors and processors.

Table 7 indicates the differences in the businesses in the three major regions which were represented in the network, highlighting the role that each region plays in the food network. A total of 74.5% of the businesses identified in the interviewee's supply network from surrounding London-Middlesex (LM) were 'other' food businesses such as small food processors, retailers and restaurants. Nevertheless, a considerable proportion of suppliers from LM were farmers (21.4%). Businesses identified in the rest of SWO (outside LM) were primarily farmers (67.7%), with a quarter being other food businesses. In contrast, 50% of businesses identified in the Central Ontario region (home to the Ontario Food Terminal) were distributors, and another third were processors.

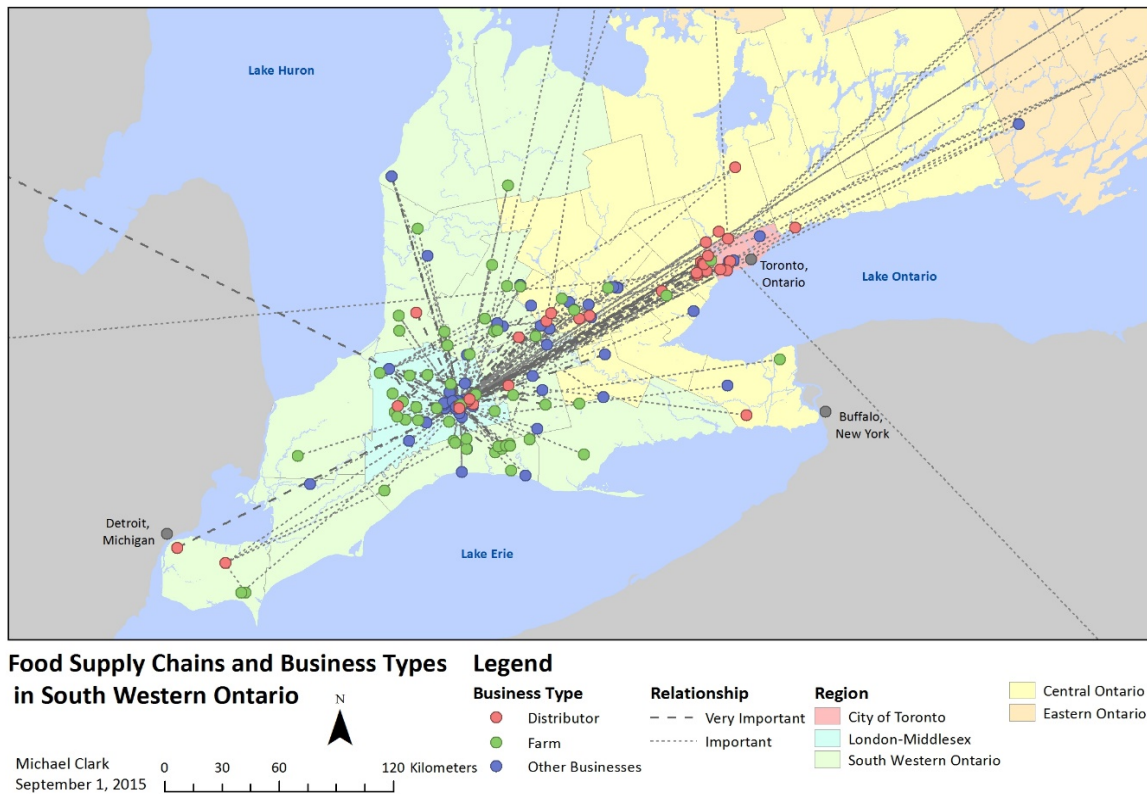


Figure 3. Food supply chains in South Western Ontario of businesses in the Old East Village Food District

Table 6. Locations of direct suppliers, by interviewee business type

	All Interviewees		Raw Food Retailer		Prepared Food Retailer		Restaurant / Café	
	#	%	#	%	#	%	#	%
Old East Village Food District	46	22%	15	14%	13	27%	18	37%
London-Middlesex	95	46%	43	40%	21	43%	31	63%
South Western Ontario	58	28%	39	36%	14	29%	5	10%
Central Ontario	47	23%	24	22%	12	24%	11	22%
Eastern Ontario	1	0%	0	0%	1	2%	0	0%
Canada	2	1%	0	0%	0	0%	2	4%

Table 7. Types of businesses in the supply network, by selected regions

	Farm		Distributor		Other Business		Total Businesses	
	#	%	#	%	#	%	#	%
London-Middlesex	21	21.4%	4	4.1%	73	74.5%	98	100
South Western Ontario	42	67.7%	5	8.1%	15	24.2%	62	100
Central Ontario	6	12.5%	24	50.0%	18	37.5%	48	100

Table 8. Average distance (KMs) between an interviewee and direct farms suppliers

	All Interviewees	Food Retailer	Prepared Food Retailer	Restaurant / Café
Mean	48	47	45	66
Median	35	33	44	41
Min	3	3	10	28
Max	170	170	102	153

Most of the farms identified as suppliers were located in or immediately around the City of London. On average, direct farm suppliers were located only 48km away from the businesses interviewed, while the median distance was 35km (Table 8). The furthest direct farm supplier was 170km from the interviewees; however, 65% of direct farm suppliers were within 50km of the interviewee.

6. Discussion

The discussion section will first outline some of the key characteristics of the food district, and then follow with a discussion of the advantages and disadvantages of the methodology.

6.1 Breaking Assumptions of Food Systems

6.1.1 Availability of Local Food

London is located in South Western Ontario, a region which specializes in the production of the global cash crops of corn, soybeans and wheat; however, there is also produce, fruit and meat that is grown/raised in the region. The 21 interviewees in this study identified 63 farms from Middlesex County and South Western Ontario which supplied food to their businesses in the Old East Village Food District, either directly or through a distributor. This demonstrates that small food businesses can be leaders in establishing direct or short food supply chains between local farmers and businesses. Nearly half (10) of the interviewees mentioned that they offer local food as a selling feature of their business. Businesses had different definitions of local; however, the longest direct farm relationship was only 170km, which is consistent with boundary of the '100 mile diet', while 65% of direct farm relationships were within 50km of the business.

6.1.2 Role of Distributors

Interviewees identified a surprisingly large number of food distributors. Aside from the Ontario Food Terminal in Toronto, the most commonly used distributors only supplied a maximum of 3 of the businesses interviewed (14%). The food industry is highly competitive and a total of 24 different distributors were identified. These ranged in business size and coverage area from London-based businesses that only served the city to Canada-wide distributors. Some distributors specialize in specific products such as grains and spices, while others offer a wide range of products.

Large distributors were typically located in the Greater Toronto Area, possibly with a regional office in London or nearby. These distributors were not feasible for many businesses since the minimum order size was too high for the size of the businesses interviewed. In addition, very little information about the food provenance, such as where and how it was produced was provided. In contrast, a

number of the smaller local distributors located in or around London specialised in offering local or organic food sourced directly from farmers. The counties South West of London account for 30% of Ontario's field vegetable agricultural land, however only a few farms were identified as suppliers. This may be partially explained by a lack of established distributors in the region. The only two distributors in the region are a food retailer who has recently expanded to undertake some small scale distribution and a specialty food distributor. The term 'distributor' is often given a negative connotation as a middleman that increases the price consumers pay for food, however they also provide a very valuable service. This is seen in the recent trend calling for regional food hubs to help aggregate and distribute local food (Blay-Palmer et al. 2013).

6.1.3 Horizontal Linkages

Many of the businesses interviewed worked with neighbouring businesses in the Food District, often selling each other's products, or purchasing together. However, many others worked more closely with businesses in other non-geographic 'clusters' such as industry specific networks, or political / social / environmental networks and ethnic communities. The informal nature of the cluster enabled new businesses to enter the food district and establish their own support networks, rather than having to comply with existing hierarchies.

6.2 Value of Methodology

6.2.1 Foodshed Analysis

This research used interviews with business owners to map the foodshed, including the supply chains and partnerships, of businesses in a food district. This approach provides a number of benefits to studying food districts and developing public policy to support local food systems. It allows for the identification of existing successful supply chains as well as gaps in the distribution system that limit businesses from sourcing local food.

The food system offers challenges for social network analysis, since it is not a closed system, and it is therefore not possible for researchers to interview every business in a food network. This study included interviews with a sample of businesses in a food district; however, even if all businesses within the food district were interviewed, the district boundary is irrelevant to the businesses when they are determining who to work with. This limitation in the use of social network analysis illustrates the fact that food systems cannot be assumed to be constrained or limited by municipal, regional or provincial political boundaries. In today's globalised world, food from all over the world is consumed all over the world. Despite all of the local supply connections identified, the majority of food consumed in the food district, especially in the winter, is likely produced in California and South America and brought to Canada via distributors through the Ontario Food Terminal.

6.2.2 Semi-Structured Interviews

Using interviews to build the networks allows for a rich understanding of the importance and strength of each relationship. The perspectives of small business owners are often neglected in food system research since they have limited time to participate in research studies. Interviews were used instead of surveys since it was found that surveys were often ignored or only partially completed. Interviews require active face-to-face recruitment and the building of mutual trust between the

interviewer and the interviewee that proprietary supplier information will remain confidential. Using interviews was useful for prompting interviewees to list all of their suppliers for all the food products they use, rather than just the largest ones. Due to the complexity of our global food system, many businesses only knew their direct suppliers and did not know where exactly the food was grown. Interviews allow not only for the identification of suppliers, but also for understanding when and why other suppliers are not mentioned.

7. Conclusions and Areas of Further Study

It is recommended that the foodshed analysis techniques used in this study are incorporated into more food system research. This can be of great benefit to policy makers and planners when considering policy changes and investments in infrastructure. Small businesses need to be recognised as important actors in 'alternative' and 'local' food systems since they are well positioned to take advantage of new and niche opportunities which large agri-food businesses cannot respond to. The research shows that the regional implication of local food policy needs to be considered, since the food system crosses local, regional and even international boundaries.

Further research using foodshed, network and supply chain analysis is needed to study the evolution of a food system over a period of time, to provide valuable insight into how food systems grow, develop and adapt to policy and other changes. Foodshed analysis could also be used to compare different communities within a food system. This study focussed on small food retailer and processors; however, a similar study with farmers would improve the understanding of the other side of the food system and the opportunities and challenges for supplying food to the food district.

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