Sustainable horticultural supply chain: the case of local food networks in the United Kingdom

Sustainable Horticultural Supply Chains: The Case of Local Food Networks in the United Kingdom.

David Pearson* and Alison Bailey
School of Agriculture, Policy and Development
University of Reading RG6 6AR UK.
*Contact author. Email: d.pearson@reading.ac.uk Phone: +44 (0) 118 348 8470

Keywords: Fresh produce, distribution channel, regional food.

ABSTRACT

In the UK there is widespread support from Government, media and consumers for local food networks. These have the potential to provide a more sustainable supply chain and are well suited to the unique production and consumption characteristics of horticultural products. In terms of food marketing, local food is in its relative infancy and is still without any formal definition. This lack of clarity hampers research activities. Although the profile of local food buyers and their expectations has been explored, our knowledge of its social, economic and environmental aspects is minimal. This research contributes by exploring the structure and scope of local food activities in the UK in terms of profiling those specialised retail outlets who provide consumers with the opportunity to purchase locally grown horticultural products.

INTRODUCTION

Healthy, economically viable and environmentally sustainable food is crucial to social well-being (Curry, 2002). In the UK there is widespread support for sustainable consumption. This is as a result of general concerns about the degradation of the natural environment. In addition, increased concerns of global warming and rising prices associated with peak oil has directed attention towards shortening the supply chain which includes promoting the benefits of purchasing local food. Encouragement for this is coming from government, commercial and charity sectors as well as celebrities, such as food writers and television chefs. Local food is perceived to provide a range of interrelated economic, social and environmental benefits. Although there is no formal definition of the term 'local food', it is generally accepted that it may be applied to foods that are grown, processed, purchased, and consumed within a single region.

In contrast to other niche markets, such as the organic food movement (Hughner et al., 2007, Willer et al., 2008), local food is still in its relative infancy. There is an emerging body of research, both in the UK and internationally, that is contributing to our understanding of it. This includes work by rural sociologists and geographers (Riketts-Hein et al., 2006), food scientists (Roininen et al., 2006), economists (Oglethorpe, 2008) and the recent interdisciplinary Rural Economy and Land Use (http://www.relu.ac.uk/) program in which local food was a component. Results from the latter have encompassed a life cycle analysis including full carbon budgets for food supply chains (Edwards-Jones et al., 2007) as well as identification of perceived benefits to consumers (Chambers et al., 2007).

The local food sector is developing rapidly in response to consumer demand. This growth is being stimulated by Government led initiatives such as the £50 million Local Food Consortium (http://www.rswt.org/localfood/) and the £10 million Making Local

Food Work program (http://www.makinglocalfoodwork.co.uk/). Collectively these will provide a quantum increase in consumer awareness and availability of local food through a series of grass roots projects. However, extant knowledge of the social and economic aspects of local food is minimal. Although the profile of local food buyers and their expectations has been explored (FSA, 2003, FSA, 2007), the structure and scope of local food activities in the UK is largely unknown, as is our understanding of the organisations that exist in this sector. Prior to profiling those specialised retail outlets which supply local food this article continues by providing a brief review of the origins of sustainability, and an overview of horticultural and local food supply chains.

SUSTAINABILITY

The origins of sustainability emerge from when mankind first used its skills in communication and management to move from a true hunter and gatherer relationship with the natural environment towards the planned management of crops and animals, that is, the birth of what we now call agriculture. As food producers created ever increasing surpluses above their own requirements, society emerged into those who have skills in meeting the immediate and medium term needs of providing food, and those who deliver other services. Indeed as agriculture developed, with increases in production derived from improving management skills, from selective breeding of edible plants and fruit producing trees as well as the domestication of animals, permanent human settlements became a possibility. And with gradual improvements in transport it became possible to live at a distance from the source of production and the first agricultural supply chains emerged. However, this has come at a cost.

In the early stages it is easy to imagine that there was a general abundance of productive natural resources for agriculture, such as access to fertile land with adequate water. However as populations grew these became scarce and no doubt became the target for many unfriendly incursions. It is in this scarcity that the notion of sustainability emerges with its economic, social, and environmental facets. Economic sustainability is the financial viability of the individuals and organisations in the supply chain. Social sustainability refers to the continued operation of individuals in their webs of human relationships including families and friends through to organisations and communities. Environmental sustainability refers to the continuation of natural ecosystems. From a human perspective this tends to focus on their capacity to provide adequate food, water and air. However, it also includes a place to live and work as well as a place for recreation and other enjoyments. Thus the sustainability of a food supply chain brings together ecosystems as well as organisations and individuals directly involved in it and to the population who rely on it for their nourishment.

The notion of sustainability raises some interesting issues, as the very act of human existence results in an interaction or impact. One way is to consider this is the capacity of the system to replace the material used and to deal with the waste products resulting from its use. This is the fundamental premise behind the notion of ‘ecological footprint’ (see for example the seminal research by Wackernagel (1996). The more commonly used ‘carbon footprint’, only measures the energy equivalent of the activity, or products, in terms of amount of carbon produced (or more precisely the amount of carbon dioxide that would be released if this amount of energy was generated from fossil fuel sources, see for example UK Governments Carbon Trust initiative http://www.carbontrust.co.uk/).

Thus the sustainability of a horticultural supply chain could be considered from multiple perspectives and measured in many different ways, each of which only provides a narrow perspective on this complex issue. A brief overview of the stages in horticultural supply chains will be provided in the following sections, commencing with production and distribution.

HORTICULTURAL PRODUCTION AND DISTRIBUTION

There are a large number of different products grown in the UK ranging from tree fruits (e.g. apples and plums) and soft fruits (e.g. black currants and strawberries) to field vegetables (e.g. carrots and potatoes) and protected crops (e.g. tomatoes and lettuces) (HDC, 2008). Production units range from large scale operations, covering many acres of field vegetables and thousands of fruit trees right through to small commercial growers. Only a small amount (5%) of domestic production is exported whilst imports account for a significant (35%) of total consumption (£16B). Non indigenous products, that is, those which can not be grown in the UK, accounts for a significant portion of the imports (40%) whilst the remainder add to domestic production as well as ensuring the year round availability of seasonal products (Defra, 2007). The physical distribution of horticultural products reflects the great diversity of producers, products and retail outlets. At one extreme there is a multi-organisation supply chain that includes overseas countries, such as the supply of out of season apples grown in New Zealand and ultimately purchased in a supermarket in the UK. At the other extreme there is the production, distribution and consumption within one community, such as a local supplier of fresh berries where buyers pick-their-own products. This situation is further complicated when processed horticultural products are considered. This may include multi-ingredient products, sourced from many countries and undergoing many stages of production, such as a frozen meal solution.

PHYSICAL DISTRIBUTION OF HORTICULTURAL PRODUCTS

The retail sector in the UK is extremely competitive with four major supermarket chains controlling around 80% of grocery sales. These range from premium supermarkets such as Marks & Spencer and Waitrose, through to the value proposition offered by Tesco who have the single largest market share at just over 30% (TNS, 2007), and the cheaper offers provided by the likes of Asda and Morrisons. Fresh fruits and vegetables remain an important product category for all of these supermarkets in terms of enhancing their image as providers of healthy products and contributing to their profits. Further these products are also sold in semi prepared forms, such as peeled and diced pumpkin, as well as being a component in ‘heat and eat’ meal solutions. The food service sector is also a major and increasing source of horticultural products for human consumption. This includes the full range of food eaten away from home, such as take-away food, restaurant meals as well as food consumed in institutions. The latter includes schools, hospitals and other publically controlled organisations. Recognition of this fact has led some countries to use Government controlled purchases, or public procurement, to influence the development of supply chains. A notable example is the £17 million Lottery funded Food For Life Program in the UK. This is creating a network of schools and communities across England who are committed to transforming food culture by improving school meals, reconnecting young people with where their food comes from and inspiring

families to cook and grow food. To achieve the Gold standard they must, amongst other things, source at least 50% of ingredients locally (FFLP, 2008).

CONSUMPTION OF HORTICULTURAL PRODUCTS

The vast majority of horticultural production is directed towards human food consumption. However, small amounts are also used in areas such as pharmaceuticals, fibres and fuels, as well as non-human uses such as animal feeds and industrial applications. Horticultural products are one of the major food groups for humans and are seen as being extremely important to human health, particularly in terms of reducing obesity, maintaining a healthy heart and preventing degenerative diseases such as cancer. As with many other countries this has led to Government funded programs in the UK, such as 5-a-day (NHS, 2008) which aims to increase the daily consumption of fresh fruits and vegetables. Consumption has increased from three portions per day 25 years ago but at four portions is still below the Government target of five per day. Individual expenditure on fresh fruits and vegetables is relatively modest as it amounts to an average of almost £2 per person per week for fruits and just over £3 for vegetables (Defra, 2007).

LOCAL FOOD

Local food is an approach where the aim to is to reduce the length of the supply chain. As such it may be seen as a new term to describe an old concept. However this diminishes the important contribution that it makes. In an era before the easy access to relatively cheap transport (which of course still exists in some areas of lesser developed countries) the difficulties of transporting food meant that people tended to eat what they could produce and harvest locally and hence all food was local food. However today local food is a term that is used to describe a food system that is the opposite of a highly globalised food economy. It describes a direction to be facing, from which steps to create a more localised food network can be taken. As such it is difficult to define local food with a quantitative measure, such as within a particular radius or from a particular region. In part this is because the diet that has evolved in the UK includes expectations that can not be met by local geographic conditions. For example, bananas cannot be grown in the UK, except with energy intensive glasshouse production, yet they are a major product line for all supermarkets. In addition, it is important to mention that consumer expectations include the year round availability of some seasonal products. For example, most consumers expect to be able to purchase fresh tomatoes throughout the year, when, under natural conditions, they only have a very short growing season in the UK.

In addition to the environmental advantages from local food it has a number of potential social and economic benefits. The most important environmental benefit is the reduction in food miles. And this is attractive because transport has a negative impact on the environment due to its consumption of fossil fuels and pollution caused from ‘green house’ gasses emitted, noise produced and requirement for road infrastructure. This reduction in transport costs may also lead to a reduction in overall costs. The social benefit may include increased local employment, improved sense of community, which may assist in rejuvenating the countryside.

However, there are also disadvantages from local food, some of which are hidden. One of the major issues is that it diminishes the benefit from comparative advantages in production, this being, where a particular region is able to provide a product at lower economic, and sometimes environmental, cost. Hence the widespread adaption of local

food would result in customers in other regions either missing out on being able to purchase the product, or if they do, they will purchase a locally grown product at a higher price and/or higher environmental impact. An interesting example is apples and lamb. The UK is a big importer of apples and lamb from New Zealand. In a recent study it was found that the carbon foot print of in season production and transport from, literally, the other side of the world to the UK resulted in a smaller energy usage than storage of the product for six months to allow for out of season consumption (Saunders and Barber, 2007). Another interesting tension emerges from considering importing products from lesser developed countries. There is a general trend for Northern European countries, such as the UK, to import food products from lesser developed countries in the South, mainly Africa. This was demonstrated when the largest certifier of organic food in the UK explored the possibility of banning the air freight of fresh products. In the ensuing consultation, it was agreed that airfreight, with its extremely high carbon footprint relative to other forms of transport, would only be allowed when it could demonstrate a clear developmental benefit to the exporting country (SA, 2008).

LOCAL FOOD SUPPLY CHAINS

Supermarkets are continuing to increase their dominance as the preferred option for household purchases of grocery items, including horticultural products. They represent an incredibly efficient logistic network, which is able to source and distribute a huge range of individual products, often over 40 000 in each store. These shops offer relatively low prices and a convenient shopping experience in terms of parking, opening hours and that of one-stop shopping. As previously mentioned, in the UK it has been estimated that these multiple or chain stores account for around 80% of grocery sales. As part of their desire to meet changing customer preferences many are publically expressing their desire to increase the 'localness' of their products. For example, the largest grocery retailer in the UK, Tesco, states that they have over 7 000 local products in their stores and have plans for even more (Tesco, 2008). Although they use Britain, which is a rather large geographic boundary for their definition of local food, it is interesting that local food is important to them.

There are some non-supermarket retail outlets that sell local products - some of these explicitly require local products, such are a farmers markets, whilst others tend to be more local products as a result of their business strategy. In the UK permission to operate any market, farmers or otherwise, is usually provided by the local government authority. A market tends to refer to the temporary provision of space for sellers to offer products, on a periodic basis, such as weekly or monthly or for a special event. However, there are some famous examples of permanent markets, such as the Covent Garden Market in London (http://www.coventgardenmarket.co.uk/) or the Oxford Covered Market (http://www.oxford-covered-market.co.uk/).

There are two particular types of market that focus on local food products, these being Farmers' Markets and Country Markets. Of the 500 or so farmers' markets in the UK with annual sales in excess of £500 million, over 200 are Certified Farmers' Markets which comply with specific standards. In certified markets the food must be local, which is expressed as a radius, with preference being given to 30 miles [50 kilometres], with up to 50 miles [80 kilometres] is accepted for larger cities as well as for remote towns and villages, and 100 miles [160 kilometres] is the absolute maximum. Local may also be considered as a County or geographic boundary that is similar in size to the radius option. Also, the products must be grown or reared on the producer's land and the stall must be

operated by someone directly involved in the foods' production (FARMA, 2008b). Country Markets are similar to farmers markets however they provide opportunities for home producers to sell items locally and co-operatively, directly to the public. Their logo is 'home-grown, home-made, hand-crafted' and all perishable foods must be fresh. There are around 400 Country Markets in the UK with an annual turnover of around £10 million (CM, 2008).

Farm shops and box schemes are other types of retail outlets that tend to provide more local food. There are over 1000 farm shops that sell direct to the public in the UK. Of these, over 50 have passed the FARMA accreditation for quality, service, value and sell only local foods (FARMA, 2008a). Box schemes are another example of a supply chain that provides local food. Also known as a vegetable box schemes, they are usually run by a farmer who makes weekly deliveries either directly to homes or to a local collection point. All customers receive the same range of seasonal fresh fruits and vegetables in their box, although some include other items such as meat and dairy items. Most of these products are locally grown and often from certified organic farmers. Most urban consumers are able to choose from a number of competing box schemes. Some of these are explicitly local, such as Tolhurst Organics (http://www.tolhurstorganic.co.uk/), whilst others are large businesses, such as Riverford (http://www.riverford.co.uk/) with annual sales in excess of £20 million, 300 staff and delivering 40 000 boxes each week. Many of these have emerged from the organic food movement and it has been stated that sales through organic box schemes were £95 million in 2005 (SA, 2007).

The co-operative business structure, being member controlled and often giving high priority to social aims, is used to provide services varying from social care for the elderly to food retailing. At a national level they are supported through Co-operativesUK (http://www.cooperatives-uk.coop/). Food co-operatives include small operations, such as True Food Co-op (http://www.truefood.coop/) with annual sales of £250 000, to The Co-operative which is a large supermarket chain that has backward integrated into sourcing products from its own farms and has £10 billion turnover (http://www.co-operative.coop/).

Another approach to developing a sustainable supply chain which removes many of the intermediate stages between producer and consumer is that of Community Supported Agriculture (CSA). These create a partnership where consumers invest in a local farm in return for a share of the harvest. This investment is often in advance, in cash or kind (working on the farm). Many CSA's use organic methods and have the additional benefit of reconnecting consumers with the source of their food.

And finally, perhaps the most sustainable supply chain is when the food is grown in a domestic garden or allotment, where the sustainability of the supply chain is measured in 'food feet', rather than 'food miles'. Home owners in the UK are renowned for their gardens. These range from acres of sculptured gardens surrounding a stately home to a window box of herbs in a suburban flat. Gardens have many purposes including recreation and beauty as well as food production. There are numerous organisations that support different aspects of gardening including the Royal Horticultural Society (http://www.rhs.org.uk/) and more specialised organisations such as Garden Organic (http://www.gardenorganic.org.uk/). In addition to home gardens, an Act of Parliament over 100 years ago gave the UK public the right to an allotment garden. This access to a small area of public land for growing gives them the possibility of fresh affordable food and according to the National Allotment and Gardeners Trust, in many areas allotment associations have lengthy waiting lists (http://www.nagtrust.org/).

In summary, many different supply chains for local food have evolved, each with different sustainability credentials. The following section gives a brief overview of the customers who purchase local food.

LOCAL FOOD CUSTOMERS

The attitudes and motivations for consumers to get involved with local food are many. Research (FSA, 2003) has suggested that it is not just one simple concept, rather, the local food sector embraces various layers of appeal for consumers. Whilst local food of course implies proximity it also carries overtones of small scale, environmentally friendly, artisan craft and a general avoidance of mass production. As such, in relation to foods, is has a particular resonance for fresh products. For those who find supermarket shopping generally convenient but dull, local food buying (except for local food in supermarkets) offers a leisurely and pleasurable alternative. Consequently shopping for local food tends to be sporadic and opportunistic. Local food customers may be segmented into clusters, based on their different motivations.

- Quality: To do with the perceived superior freshness, and taste, of the food.
- Community: Support the local economy and local services.
- Confidence: Knowledge of the foods source or provenance.
- Health: Perceptions being fresh and using fewer chemicals for maintaining freshness.
- Green: Concern for sustainability and the environment.
- Pluralist: Options for food shopping, rather than dominance by supermarkets.
- Enrichment: Diversity of food shopping experiences, including some leisure value (FSA, 2003:32)

The Government in the UK has continued to monitor developments in the local food sector. With its Food Standards Agency and their overarching concern for informed consumer choice, it has recently published results from a consumer survey which asked whether food labelling and other marketing activities of businesses supplying these products should be regulated, and almost two thirds (62%) felt that it should (FSA, 2007). However, how such a local food assurance scheme would work remains unanswered.

CONCLUSION

This review of local food in the UK has identified many different horticultural supply chains that have developed in response to Government initiatives and consumer demand. However, there is a paucity of research in this area. To enable it to continue to grow it will need to maintain credibility with consumers and justify its perceived sustainability benefits to Government. An immediate priority for research is to explore the possibility of providing a clearer definition of local food. Such endeavours will make it easier to measure the size of this sector and monitor its anticipated growth. This will contribute to being able to understand its impact. Another important area for research is to explore the possibility of developing some form of consumer assurance for the 'localness' of foods. This could be a label on the product, such as a measurement label like the carbon label, or an assurance label, such as organic certification. Another important area of research is to capture the benefits, both in terms of ongoing grass roots projects and for future policy directions, from the recent major publically funded grant programs in the UK. Further research by the author will contribute to our understanding of its social, economic and environmental sustainability profiling the activities of the

various supply chains, that is, local food in supermarkets, farmers markets, farm shops, box schemes, and finally home grown food. These profiles will provide an estimation of the size and scope of their activities as well as provide case studies of successful local food enterprises.

REFERENCES

Chambers, S., Lobb, A., Butler, L., Harvey, K. & Traill, B. 2007. Local, national and imported foods: A qualitative study. Appetite, 49**,** 208-13.

CM 2008. Welcome to country markets... http://www.country-markets.co.uk/ [31 July].

Curry, D. 2002. Farming and food: a sustainable future. Cabinet Office, London.

Defra 2007. Food statistics pocketbook. Department of Environment, Food and Rural Affairs, London.

Edwards-Jones, G., Koerber, G., York, L. and Canals, L. 2007. Identifying and managing emissions from farms and food chains. Carbon Footprint Supply Chain Summit. 24-25 May, London.

FARMA 2008a. Farm shop certification (Accreditation). http://www.farmshopping.net/farm-shop-certification.htm [31 July].

FARMA 2008b. Farmers' market certification. http://www.farmersmarkets.net/certification2.htm [31 July].

FFLP 2008. Food for life partnership. http://www.foodforlife.org.uk/ [31 July].

FSA 2003. Local food: Report on qualitative research. Food Standards Agency, London.

FSA 2007. Local food: Omnibus research report. Food Standards Agency, London.

FSA 2008. The eatwell plate. http://www.eatwell.gov.uk/healthydiet/eatwellplate/ [31 July].

HDC 2008. Horticultural Development Company. http://www.hdc.org.uk/ [31 July].

Hughner, R., McDonagh, P., Prothero, A., Shultz, J. and Stanton, J. 2007. Who are organic food consumers? A compilation and review of why people purchase organic food. Journal of Consumer Behaviour, 6**,** 94-110.

NHS 2008. 5 a day - just eat more fruit and veg. http://www.5aday.nhs.uk/ [31 July].

Oglethorpe, D. 2008. What's so good about Local Food? Agricultural Economics Society Conference titled Our food economy - Are we connected yet?' 24 Jan, London.

Riketts-Hein, J., Ilbery, B. and Kneafsey, M. 2006. The distribution of local food activity in England and Wales: an index of food relocalisation. Regional Studies, 40**,** 289-301.

Roininen, K., Arvola, A. and Lahteenmaki, L. 2006. Exploring consumers' perceptions of local food with two different qualitative techniques: Laddering and word association. Food Quality and Preference, 17**,** 20-30.

SA 2007. Organic Market Report. Soil Association, Bristol, United Kingdom.

SA 2008. Air freight consultation. http://www.soilassociation.org/airfreight [31 July].

Saunders, C. and Barber, A. 2007. Comparative Energy and Greenhouse Gas Emissions of New Zealand's and the UK's Dairy Industry. AERU Research Report No. 297, Lincoln University, Lincoln, Canterbury, New Zealand.

Tesco 2008. Talking Tesco. http://www.tesco.com/talkingtesco/suppliers/ [31 July].

TNS 2007. World Panel Reference Library - Grocery Share of Trade 4th Nov 2007. https://www.tnsinfo.com/TNSInfo/ [31 July].

Wackernagel, M. and Rees, W. 1996. Our Ecological Footprint, New Society Publishers, Gabriola Island, British Colombia, Canada.

Willer, H., Yussefi-Menzler, M. and Sorensen, N. 2008. The world of organic agriculture: statistics and emerging trends, Earthscan, London.