

## **SHORT FOOD SUPPLY CHAIN AND ENVIRONMENTAL "FOODPRINT": WHY CONSUMPTION PATTERN CHANGES COULD MATTER MORE THAN PRODUCTION AND DISTRIBUTION AND WHY IT IS RELEVANT FOR PLANNING**

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*Abstract: Short Food Supply Chains (SFSCs), as defined by Kneafsey et al. (2013) have been presented by many regional and urban planning works as a major potential contributor to food's environmental footprint ("foodprint") reduction and natural allies to local sustainability policies. Yet, these positive impacts have not always been assessed systematically and part of the enthusiasm among scholars and practitioners seem to rely on untested assumptions, bearing important risks for planning and policy elaboration (Edward-Jones, 2010). This knowledge gap is therefore to be bridged.*

*After having tackled definition issues in the introduction, the first part explores the potential opportunities (in production, distribution and consumption) of foodprint reduction, trying to single out the most promising ones. The second part of the review is dedicated to studying more in depth how consumption shifts are influenced by SFSC. In the final part, potential implications for planning and sustainability policies. Paths for future research are also exposed.*

*The literature reviewed seems to indicate that, contrary to what is commonly emphasized in planning literature, the change of consumption patterns (i.e. reducing meat intake) might be the greatest "foodprint" reduction contributor (Garnett, 2011) and that SFSCs greatly contribute to them through the reconnection to the agricultural territory, the routinization of sustainable behaviors and educational processes.*

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### **1. Introduction**

Major European metropolis such as Paris and Milan already engaged in paths of environmental reduction of their environmental impact, driven by political will and strong external pressures such as:

- growing interest from citizens with both individual (quality of living environment) and social (overcoming the environmental crisis) driving forces;
- pressure coming from states and EU, who committed to reduce emission (Kyoto) and reduce water pollution (EU framework directive) and likely to increase with decentralization of environment related competences to regions.

Their objectives are often translated into quantified indicator reduction targets. The use of indicators of major environmental indicators is not straightforward and their role in local sustainability policy has been criticized.

However, reviewing the existing literature on local sustainability indicators and their relationship with governance, Holman (2009) noticed that indicators could facilitate the dialogue between central and local government, help picturing concretely what sustainability means and offer learning opportunities to stakeholders.

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The choice of indicators remains debatable and some authors argue for the co-construction of local indicators, enabling stakeholder engagement. However, relying on major –internationally recognized – such as GreenHouse Gases emissions (GHGe) and Water Footprint could prove more efficient for dialoguing with upper levels (national and international) and setting up international comparisons. Besides, the vast literature and databases available on such indicators would make it easier to assess precisely the environmental impact of human activities.

The food system, understood as the production (including processing), distribution and consumption (including waste) of Food is responsible for a considerable share of human activities' impact on environment. For instance, roughly 25% of total Green House Gas emissions (Vermeulen et al., 2012) come from it and agriculture accounts for about 70% of total water withdrawals worldwide<sup>2</sup>. Food became an object of interest at the city/regional level and a relevant topic for planning to address, both at the theoretical and practical level (Ilieva, 2013). It has already been identified by many major cities as a promising field for acting on GHGe<sup>3</sup>.

The expression "foodprint", has gained popularity in the literature of the past few years. The term however encompasses a variety of realities and is often used as replacement for "footprint" when talking about food, without being defined more precisely (such as in Stoessel et al., 2012 or Billien et al., 2009 – where it is wrote "food-print"). For the sake of clarity, the present article considers "foodprint" as the impact of food system over major environmental indicators, mainly GHGe and Water Footprint. Other secondary indicators, such as energy use and nitrate release will also be mentioned, as they have a direct influence on the formers.

Among other solutions for reducing foodprint, the shortening of supply chain, or reconnection between production and consumption sites, have gained considerable momentum both in the scientific literature and in the media (Edward-Jones et al., 2008).

Academic interest on the topic has also experienced a tremendous development in the past two decades, some authors even talking about a "disproportionate interest" of the literature when compared to the actual size of the phenomenon (Deverre & Lamine, 2010). It therefore seems relevant to dedicate particular attention to them when considering the phenomenon as a whole. Besides its media and academic visibility, local food movement's intrinsic diversity is an excellent illustration of how hard it is to delimitate precisely these object, being for policy or research purposes. As a matter of fact: "Local food systems", "locavorism", "short food supply chain", "city farms", "urban farming", "alternative food systems", "community supported agriculture" (and many others), have all raised interest, support and critiques in recent debates.

Heated debates are still taking place: some argue not to focus only on niche initiatives and to "move beyond the alternative" (Franklin et al., 2011), others claim that loose definitions could lead to nonsenses (such as considering Wal-Mart as a local food actor, see Delind, 2011). We will retain the quite ample, but functional, notion of "Short Food Supply Chains" (SFSCs) and the definition proposed by Kneafsey et al. (2013) "The foods involved are identified by, and traceable to a farmer. The number of intermediaries between farmer and consumer should be 'minimal' or ideally nil."

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<sup>2</sup> [http://wwf.panda.org/what\\_we\\_do/footprint/agriculture/impacts/water\\_use/](http://wwf.panda.org/what_we_do/footprint/agriculture/impacts/water_use/)

<sup>3</sup> See for instance Paris' "Plan Alimentation Durable", supporting the "Plan Climat Energie" and focusing on collective restauration. <http://observatoire.pcet-ademe.fr/action/fiche/154/le-plan-d-alimentation-durable-de-paris>

The first part of the paper (section 2) will be dedicated to exploring, building on the available literature, opportunities for foodprint reduction within the food system. The following section (3) will then, based on these conclusions, see how SFSCs could contribute to tapping these opportunities. Section 4 will be dedicated, in an exploratory effort, to envision more broadly the potential implications of such a relationship for sustainability planning.

## **2. Foodprint reduction opportunities**

Given the importance of the food system in the total footprint of human activities over the environment, many authors have tried and identify the most promising fields for effective and achievable foodprint reduction. One of the most remarkable efforts of gathering the existing evidence has been achieved by Tara Garnett in her 2011 article.

Building on her analysis, and for the sake of analytical purposes, the available evidence on foodprint reduction opportunities will be considered in each of the different components of food systems: production (including processing), distribution and consumption (including waste). These distinctions should not be taken as a clear-cut separation, for the items presented separately are often overlapping (especially for consumption), but rather as a lens-shifting exercise, putting the focus on different sides of the issue.

### **2.1 Distribution**

When dealing with foodprint, the questions of scale and distance between producer and consumer (also called "food miles") are the ones that immediately come to mind. A widespread idea in the local food literature is that reduced food miles lead to reduced energy consumption and CO<sub>2</sub> emission, for they would involve less transportation. Yet, authors such as Avetisyan et al. (2014), point out that food miles are an "over-simplified way to address the environmental problem of carbon emissions associated with food consumption"(p.418).

It is first important to notice that in most cases, even for conventional food, the last miles of transportation are the ones having the greatest greenhouse gas emission and energy consumption impact, and that distribution accounts for roughly 5% of the food sector total energy consumption (Avetisyan et al., 2014) and 10% of the total carbon footprint (Brodt et al., 2013). Therefore, interstate or international transportation can be found as being negligible (ibid). Studying the carbon footprint of common groceries in a Swiss retailer, Stoessel et al. (2012) reached the conclusion that: "it is necessary to reexamine the supposed energy advantages of 'localism' in the food sector". Coley et al. (2009) also showed the relevance of distribution format, proving that if buying organic required the customer to drive an extra 6.7 kilometers, it would annihilate any potential greenhouse gas emission benefit.

In an effort of summing up the available literature on the topic, Mundler & Rumpus (2012) gathered articles both relying on theoretical links and case studies. They reached the conclusion that "all this research converges to challenge the presumed advantages of geographical proximity in terms of food distribution energy efficiency" (p.610). Although they also underline several limitations resulting from methodological differences and the considerable margin for improvement many authors mentioned, these quite counterintuitive findings could prove insightful for the planning literature. To

put it in Coley et al.'s (2009) words, "some of the ideas behind localism in the food sector may need to be revisited".

## **2.2 Production**

Production modes of foods may vary considerably between places and types of productions, therefore the results are likely to change drastically from one case to another. Yet, for illustrative purposes, we took the example of organic production, which has been studied more extensively, with varied conclusion. Including carbon sequestration in the equation and building on the existing literature, Lynch et al. (2011) found that organic (vs conventional) production had a positive impact on energy consumption but nuanced their conclusions by stating that the effect on Green House Gas emission was not necessarily favorable.

Moreover, the particularities –especially climatic ones - of each locality have a considerable impact on production foodprint, blurring the picture even more. Brodt et al. (2013) for instance demonstrated that processed tomatoes were more energy and GHGe efficient in California, but much more water efficient in Michigan.

Beyond these illustrative examples, presenting only particular cases, authors such as Edward-Jones (2008) put forward and Garnett (2011) put forward mitigation techniques carrying potential for meaningful foodprint reduction. Garnett also mentions "non-conventional" tools, such as agro-forestry. Yet, in the same article, she stressed the fact that, instead of allowing the food production system to shifting to a more sustainable organization, it might increase its reliance over technology and energy intakes (p.S29). More importantly, both authors underline that the effects would probably not be sufficient to achieve foodprint reduction at levels that would match what is demanded to cope with the current ecological crisis.

## **2.3 Consumption**

Consumption patterns evolution has direct (waste reduction) and indirect (effect on production and distribution) effects. Waste reduction has been identified as capable of bringing forward a potential reduction of 10% of GreenHouse Gases emissions (Berners-Lee et al., 2012). But greater impacts are to be found in the evolution of diets and eating habits.

It is actually in meat, and especially red meat consumption reduction (reducing total calorie input or substituting with other meats, dairies or plants – also called "protein transition") that the greatest environmental impact could be achieved. Vanham et al. (2013) for instance found that, in Europe, a 23% water-footprint reduction could be achieved only from reducing meat consumption to "healthy" levels.

Reviewing the available literature, Garnett (2011) indicated that, contrary to what is commonly emphasized, the change of consumption patterns might be the greatest "foodprint" reduction contributor. Those findings have since been confirmed by separate evaluations pointing out the great footprint reduction potential of reducing meat intake – also called "protein transition" (Vanham et al., 2013), eating seasonal products (Stoessel et al., 2012) and reducing waste (Berners-Lee et al., 2012).

In order to compare this impact with the ones evoked previously, we can quote Weber & Matthews (2008) who demonstrated, thanks to an input-output model that a (roughly) 20 % red meat consumption reduction in the US would be equivalent to total re-localization (that is cancelling transportation) regarding GHG emission reduction.

A positive correlation between eating seasonal products and reducing foodprint has also been found, especially in terms of carbon and water consumption, both in production and distribution steps (Stoessel et al., 2011).

The picture here appears as more straightforward than for distribution (2.1) and production (2.2), with more consistent and significant impact of identified actions. Moreover, contrary to production and distribution, the conclusions for consumption seem to be less sensitive to local variation and valid at the global level (Tilman & Clark, 2014).

### **3. SFSCs and consumption shifts**

The literature reviewed in the previous section therefore seems to indicate that, contrary to what is commonly emphasized, the change of consumption patterns (i.e. reducing meat intake) might be the greatest "foodprint" reduction contributor (see Garnett, 2011 and 2014; Bajželj et al., 2014).

However, the consumption side seems to have been relatively less exploited than other. This is even more perceptible when dealing with SFSCs. Actually, if the positive environmental impact of SFSCs has often been put forward, authors have mainly insisted on food miles reduction or the potential benefits of non-conventional cropping techniques, leading authors like Edward-Jones (2010) to seriously question the environmental benefit of such schemes.

That relative negligence of the consumption side might be rooted in the quite complex and indirect way SFSCs influence consumption shifts, which does not appear as straightforward as others (in particular food miles reduction), with causalities sometimes hard to determine.

In order to address that point, the present section will be dedicated, relying on theoretical works and case studies, to bringing evidence on how participation in SFSCs and sustainable consumption practices are linked.

#### **3.1 Consumption shifts / Green Eating**

Weller et al. (2014) defined Green Eating as follows: "eating locally grown foods, produce that is in season and limited intake of processed foods, consuming foods and beverages that are labeled fair trade certified or certified organic and consuming meatless meals weekly and (if consuming animal products) selecting meats, poultry, and dairy that do not contain hormones or antibiotics." A comparable definition is proposed by The Food Climate Research network and its "Sustainable Healthy Diets (Food Climate Research Network, 2015).

This definition seems too wide for the scope of the present work, as it refers to sustainability in general and not environmental sustainability in particular. A narrower definition of "Green Eating", focusing on environmental impact would concentrate on factors affecting directly the foodprint of individuals and chiefly protein transition, seasonal eating and waste reduction. We therefore define

"Green Eating" as the set of behaviors contributing the reduction of foodprint through the evolution of consumption practices.

In the figure below (fig. 1), Garnett (2011), building up on Garnett (2008) gives a more precise idea of what is included in that notion by summing up links between eating behaviors and the reduction of major environmental indicators.

Priority	Action	Impact area addressed	Problems
High	Eat fewer meat and dairy products	N <sub>2</sub> O and CH <sub>4</sub> emissions; lost carbon sequestration from possible land clearance overseas; fossil fuel use	Reductions in both UK production and imports will be needed or else the problem will be shifted overseas; risk that fish takes the place of meat in people's diets, so increasing pressure on fish stocks
High	Eat no more than needed to maintain a healthy body weight)	Eating more food than needed stimulates the production of more food than is needed, and hence GHG emissions	Risk that individual people are victimised; overconsumption of food needs to be situated within an overall approach to consumption and consumerism
Medium, possibly high	Do not waste food and manage unavoidable waste properly	Less food waste permits lower levels of food production	The waste issue raises structural, system questions that are linked to the whole <i>consuming less</i> debate
Medium	Eat seasonal, robust, field grown vegetables rather than protected, fragile foods prone to spoilage and requiring heating and lighting in their cultivation, refrigeration, and rapid modes of transport	Tackles areas of refrigeration, transport, food spoilage	Measures to reduce air freighted foods may clash with international development objectives
Medium	Prepare food for more than one person and for several days	Efficiencies of scale – reduced energy use	Requires a measure of pre-planning. Trends in how people actually live and average household size make this approach difficult
Medium	Accept different notions of quality	Less waste permitting lower levels of production	Food that is edible but deemed of lower quality or undesirable goes to food processing or animal feed, or can go for export, so it may not always actually be wasted
Medium	Accept variability of supply	Tackles the problem of needing to supply foods even when the environmental cost of doing so is high	Variability within a complex food system may lead to bottlenecks and knock-on impacts which in turn can contribute to food waste; this approach may require a simpler food chain than the kind found in the developed world – one where foods are less processed
Medium	Consume fewer foods with low nutritional value e.g. Alcohol, tea, coffee, chocolate, bottled water	These 'unnecessary' foods are not needed in our diet and need not be produced	Raises major questions around free choice. Many of these foods (tea, coffee, chocolate) provide livelihoods to vast numbers of people in the developing world
Medium	Cook and store foods in energy conserving ways; possibly smart metering	Energy use in the home	Simple to do; saves money; impacts limited but useful
Lower	Shop on foot or over the internet	Reduced energy use	Research into the benefits of internet shopping is cautiously optimistic Edwards et al. (2009)

Figure 1. Green Eating behaviors, from Garnett (2011:S30)

### 3.2 How SFSCs favour Green Eating

Links between SFSCs and consumption shifts might not appear obvious at a glance, and so is the sense of causality between the two. One might actually argue that people participating in SFSCs already have adopted Green Eating behaviors and that the effect is therefore marginal.

We can however gather scattered yet persuasive evidence, coming from different literature bodies, and make a quite solid case pleading for a strong effect of participation in a SFSCs and greener eating practices for the consumer.

The major issues here are: being able to understand what is influencing attitudes, and what is allowing attitudes to be translated into behaviours (Annunziata & Scarpato, 2014).

SFSC schemes, such as Community Supported Agriculture (CSA) seem to offer the possibility to their participants to develop, implement and maintain green eating behavior over time. There is strong evidence in the literature correlating positive appreciation of local foods and healthier/greener eating behaviors (Pelletier et al., 2013), and some clues of a direct correlation between participation in such schemes and greener food consumption practices (Russell & Zepeda, 2008).



Studying a collective purchase group (GAS) in Rome, Fonte et al. (2013) reached the conclusion that the participation in such a local food scheme lead to the development of a "conscious reflexivity" among members. Not only did this allow them to adopt greener eating behaviors, it also triggered interrogations and change on non-food-related habits. The authors also reckon that participation in such a scheme had a particular importance in the routinization of behaviors, that is a crucial component of their sustainability overtime (Hormes et al., 2013). Connelly et al. (2011) also found "structural change" happening in individual behaviors thanks to the feeling of belonging in a community, in a study of two Canadian cases.

Interestingly enough, the behavior change noticed among participants to CSA does not necessarily come only, or even principally, from the establishment and enforcement of social norm but also – maybe mainly- from "structural elements" such as exposure to farm works, exchanges with producers, etc. (Russell & Zepeda, 2007). If these results were to be confirmed, it would suggest innovative paths for policy, differing substantially from the traditional communication campaigns and allowing to engaging with a wider array of consumers, which will be tentatively explored below (section 4.2).

#### **4. Potential implications for local sustainability policy and planning**

This section will tentatively aim at developing some potential implications of the observations realized in sections 2 and 3.

##### **4.1 Detaching "local foods" from the local understood as geographical proximity**

A first consequence of shifting could be to unburden the existing debate of scale questions that would become secondary, which might have some positive effects. Actually, a stream in planning literature has seen authors being quite critical what they saw as an excessive confidence in the virtues of the local (Clancy & Rhuf, 2010), arguing that there was "nothing inherent to scale" (Born & Purcell, 2006) and that the alleged benefits of local foods should be tested case by case (Edwards-Jones et al., 2008). Other authors even went further in their critique of the benevolent approach of their colleagues, warning that our understanding and judgment could be blurred by "conflation of observation with desired outcomes" and "inconsistent use of concepts" (Tregear, 2011).

Focusing on consumption rather than on production or distribution (or, as often, both), The notion of "Short Food Supply Chains" proposed in the introduction could therefore appear as one carrying less positive and negative a priori than the one of "local food", allowing for a more detached analysis. Noticeably, this could feed in not only reflections on local foods, but also on the wider movement of "localism". A recent book edited by Madanipour & Davoudi (2015) precisely aim at triggering the debate by interrogating systematically the current trend for preferring smaller scale. In a chapter of that work, Cowell (2015) developed quite critical thoughts on the idea (for instance defended by Rees, 2015) that small scale necessarily equated increased environmental sustainability, concluding that "we need[ed] to be more modest and nuanced about the connections [between the two]" (232).

In that configuration, however, local continues to matter at least in two dimensions. The first one being the cultural aspect, for it carries an emotional load that is likely to influence the behavior of consumers. Mount (2012) for instance underlined the importance of "reconnecting consumer and place" in SFSCs. The second one probably is the spatial side, since, were such changes to happen

beyond the marginal scale, they would have important spatial consequences (Edward-Jones et al., 2008, p.272). If not only local, that impact would nevertheless be *localized* and should be taken into account (and even forecasted), as much as it is possible.

#### 4.2 Citizens and consumers

Another potential implication of shifting the focus towards consumption lies in the change of perception of who might be the primary interlocutor of sustainability policies.

Traditional communication – persuasion – campaigns based on information, encouragement of positive behaviors and stigmatization of undesirable ones only have effects on a very limited audience and that are hard to maintain overtime (Hormes et al., 2013). One of the explanations of such a limited impact could stem from the fact that such awareness raising campaigns are primarily addressed to citizens, not consumers. De Bakker & Dagevos (2012) emphasized that if any meaningful –beyond niche evolution - shift towards green eating behaviors were to be achieved, it would imply “a broad view on alliances with consumers that surely must not be restricted to consumers as responsible and engaged “food citizens” (882). They went on by suggesting a typology of consumers and potential strategies for “protein transition” (replacement of meat by other protein sources) summed up in the table below:

	Weak sustainable consumption		Strong sustainable consumption
	Sustainability by stealth	Moderate involvement	Cultural change
Characterization of consumer alliance	Fairly passive relationship, oriented on minor shifts in consumption behavior	A discussion partner with whom an open dialogue is maintained	A loyal partner from whom severe criticism may be expected
Examples of eating habits and food culture	Regular eating of hybrid meat analogues or meat replacers that are perfect “taste-alikes”	Attracted to meatless or low-meat dinner as “normal” and healthy alternatives	Food citizens: vegetarian life style or a low level of (organic) meat consumption

Figure 2. Consumer typology for protein transition, from De Bakker & Dagevos (2012:886)

Fig. 2 allows us to understand the practical implications such a focus change could have on the elaboration on sustainability policies tackling food. It could be matched with the list of sustainable eating behaviors presented in Fig. 1 in order to get a more precise understanding of what kind of behaviors could be promoted to the different audiences targeted.

#### 5. Conclusions

The literature reviewed in the present paper seems to indicate that consumption shifts are a very promising field as far as footprint reduction is concerned, that has not yet been fully explored. This is particularly valid in the case of SFSCs, where distribution (especially through food miles reduction) and production have received much more attention than consumption. That fact of the matter is hardly surprising, if we are to take into account two essential elements: 1) That the planning literature on SFSCs has been widely focusing on physical proximity (sometimes excessively, as Born & Purcell already pointed out in 2006) and on alternative production; 2) That relationships between SFSCs and consumption does not appear straightforward at first sight, and that causality is



sometimes hard to determine. That field therefore appears to be to some extent under-researched, especially given its demonstrated high potential for environmental footprint reduction (see section 2.3 above).

Yet, there are convincing clues of that participation in SFSCs positively influences green eating behaviors. Beyond the recognized correlation between the two, some studies single out potential causality mechanisms. The first one would be the traditional "awareness raising" function that is not to be either over or under-estimated. In addition to this, SFSCs seem to enable a significant part of their participants to turn pre-existing attitudes into actual behaviors; that they could or would not have previously adopted. By offering concrete solutions (availability of the product, information on recipes/diets, etc.), such schemes seem to unlock sustainable behaviors; Participation in SFSCs could also be a way to maintain these behaviors, that often are quite volatile and following trends (see Hormes et al., 2013).

Potential implications for planning and local sustainability policies are still unclear at this point of the exploration of the topic. On the one hand, shifting the focus on the consumer could lead us to pay less attention to questions of scale, to put more emphasis on debates such as the "citizen – consumer" dichotomy . However, were such consumption shifts to happen beyond a marginal scale, they would have important impacts on the production and distribution systems, carrying a bundle of spatial consequences that are not to be neglected. Scholars should therefore beware, as much as the "local trap", the "disconnection trap", which would lead them to consider only the consumer, without paying attention to consequences on distribution, production and their spatial implications.

Further research therefore appears as particularly needed in the following fields:

1. Evaluate more precisely the relationship between SFSCs and consumption shifts, paying careful attention to what elements of SFSCs positively influence the adoption or maintenance over time of green eating behaviors.
2. Try and quantify this relationship, to have a more precise understanding of the potential impact of such evolutions.
3. Investigate, on the basis of these results, what could be potential policy implications for SFSCs support, if these policies were to aim at maximizing environmental footprint reduction.
4. Exploring case studies try and anticipate the potential structural (including spatial) consequences of significant consumption shifts towards green eating behaviors.

## 6. References

- Anunziata, A. and Scarpato, D., 2014. Factors affecting consumer attitudes towards food products with sustainable attributes. *Agricultural Economics (Zemědělská Ekonomika)*, 60(8), pp.353-363.
- Avetisyan, M., Hertel, T. and Sampson, G., 2014. Is local food more environmentally friendly? The GHG emissions impacts of consuming imported versus domestically produced food. *Environmental and Resource Economics*, 58, pp. 415–462.
- Bajželj, B., Richards, K. S., Allwood, J. M., Smith, P., Dennis, J. S., Curmi, E., and Gilligan, C. A., 2014. Importance of food-demand management for climate mitigation. *Nature Climate Change*, 4(10), pp.924-929.
- Berners-Lee, M.; Hoolohan, C.; Cammack, H. and Hewitt, C.N., 2012. The relative greenhouse gas impacts of realistic dietary choices. *Energy Policy*, 43, April 2012, pp. 184–190.
- Born, B. and Purcell, M., 2006. Avoiding the local trap scale and food systems in planning research. *Journal of Planning Education and Research*, 26, pp. 195–207.

- Brodt, S., Kramer, K.J., Kendall, A. and Feenstra, G., 2013. Comparing environmental impacts of regional and national-scale food supply chains: A case study of processed tomatoes. *Food Policy*, 42, pp. 106–114.
- Clancy, K. and Ruhf, K., 2010. Is local enough? Some arguments for regional food systems. *Choices*, 25, pp.123–135.
- Coley, D., Howard, M. and Winter, M., 2009. Local food, food miles and carbon emissions: A comparison of farm shop and mass distribution approaches. *Food policy*, 34, pp.150–155.
- Connelly, S., Markey, S. and Roseland, M., 2011. Bridging sustainability and the social economy: Achieving community transformation through local food initiatives. *Critical Social Policy*, 31, pp.308–324.
- Cowell, R., 2015. 'Localism and the environment: effective re-scaling for sustainability transition?. In: Madanipour, A. and Davoudi, S., (eds). *Reconsidering localism*. London: Routledge
- De Bakker, E. and Dagevos, H. (2012). Reducing meat consumption in today's consumer society: questioning the citizen-consumer gap. *Journal of Agricultural and Environmental Ethics*, 25(6), pp.877-894.
- DeLind, L.B., 2011. Are local food and the local food movement taking us where we want to go? Or are we hitching our wagons to the wrong stars?. *Agriculture and Human Values*, 28, pp.273–283.
- Deverre, C., Lamine, C., 2010. Les systèmes agroalimentaires alternatifs. *Une revue de travaux anglophones en sciences sociales. Économie rurale. Agricultures, alimentations, territoires* 57–73.
- Edwards-Jones, G., 2010. Does eating local food reduce the environmental impact of food production and enhance consumer health?. *Proceedings of the Nutrition Society*, 69, pp.582–591.
- Edwards-Jones, G., i Canals, L.M., Hounsome, N., Truninger, M., Koerber, G., Hounsome, B., Cross, P., York, E.H., Hospido, A. and Plassmann, K., 2008. Testing the assertion that "local food is best": the challenges of an evidence-based approach. *Trends in Food Science & Technology*, 19, pp.265–274.
- Feagan, R., 2007. The place of food: mapping out the "local" in local food systems. *Progress in human geography*, 31, pp.23–42.
- Feldmann, C. and Hamm, U., 2015. Consumers' perceptions and preferences for local food: A review. *Food Quality and Preference*, 40, pp.152-164.
- Fonte, M., 2013. Food consumption as social practice: Solidarity purchasing groups in Rome, Italy. *Journal of Rural Studies*, 32, pp.230–239.
- Food Climate Research Network, 2015. Policies and actions to shift eating patterns: what works?. [online] Available at: < [http://www.fcrn.org.uk/sites/default/files/fcrn\\_chatham\\_house\\_0.pdf](http://www.fcrn.org.uk/sites/default/files/fcrn_chatham_house_0.pdf) > [Accessed 10 September 2015]
- Franklin, A., Newton, J. and McEntee, J.C., 2011. Moving beyond the alternative: sustainable communities, rural resilience and the mainstreaming of local food. *Local Environment*, 16, pp.771–788.
- Garnett, T., 2008. *Cooking up a Storm: Food, Greenhouse Gas Emissions and our Changing Climate*. Food Climate Research Network, Centre for Environmental Strategy, University of Surrey, UK.
- Garnett, T., 2011. Where are the best opportunities for reducing greenhouse gas emissions in the food system (including the food chain)? *Food policy*, 36, S23–S32.
- Garnett, T. (2014) *Changing consumption: How can we change the way we eat? A discussion paper*. Food Climate Research Network, University of Oxford.
- Gatrell, J.D., Reid, N. and Ross, P., 2011. Local food systems, deserts, and maps: the spatial dynamics and policy implications of food geography. *Applied Geography*, 31, pp.1195–1196.
- Holman, N. (2009). Incorporating local sustainability indicators into structures of local governance: a review of the literature. *Local environment*, 14(4), pp.365-375.
- Hormes, J. M., Rozin, P., Green, M. C. and Fincher, K. (2013). Reading a book can change your mind, but only some changes last for a year: food attitude changes in readers of *The Omnivore's Dilemma*. *Frontiers in psychology*, 4.
- Ilieva, R., 2013. *Growing food-sensitive cities for tomorrow: how to integrate sustainable food systems and spatial planning for a brighter urban future in the 21st century*. PhD Thesis, DASTU, Politecnico di Milano.
- Kneafsey, M., Eyden-Wood, T., Bos, E., Sutton, G., Santini, F., y Paloma, S.G., Venn, L., Schmutz, U., Balázs, B. and Trenchard, L., 2013. *Short Food Supply Chains and Local Food Systems in the EU: a state of play of their socio-economic characteristics*. Publications Office.
- Knight, A.J., 2013. Evaluating local food programs: The case of Select Nova Scotia. *Evaluation and program planning*, 36, pp.29–39.

- Lynch, D.H., MacRae, R. and Martin, R.C., 2011. The carbon and global warming potential impacts of organic farming: does it have a significant role in an energy constrained world? *Sustainability* 3, pp.322–362.
- Madanipour, A. and Davoudi, S., (Eds), 2015. *Reconsidering localism*. London: Routledge
- Mount, P., 2012. Growing local food: scale and local food systems governance. *Agriculture and Human Values*, 29, pp.107–121.
- Mundler, P. and Rumpus, L., 2012. The energy efficiency of local food systems: A comparison between different modes of distribution. *Food Policy*, 37, pp.609–615.
- Pelletier, J.E., Laska, M.N., Neumark-Sztainer, D. and Story, M., 2013. Positive attitudes toward organic, local, and sustainable foods are associated with higher dietary quality among young adults. *Journal of the Academy of Nutrition and Dietetics*, 113, pp.127–132.
- Rees, W.E., 2015. Avoiding collapse: an agenda for de-growth and re-localisation. In: Madanipour, A. and Davoudi, S., (eds). *Reconsidering localism*. London: Routledge
- Renting, H., Marsden, T.K. and Banks, J., 2003. Understanding alternative food networks: exploring the role of short food supply chains in rural development. *Environment and Planning A*, 35, pp.393–412.
- Russell, W. S. and Zepeda, L., 2008. The adaptive consumer: shifting attitudes, behavior change and CSA membership renewal. *Renewable Agriculture and Food Systems*, 23(02), pp.136-148.
- Sage, C., 2012. Addressing the Faustian bargain of the modern food system: connecting sustainable agriculture with sustainable consumption. *International Journal of Agricultural Sustainability*, 10, pp.204–207.
- Stoessel, F., Juraske, R., Pfister, S. and Hellweg, S., 2012. Life cycle inventory and carbon and water footprint of fruits and vegetables: application to a Swiss retailer. *Environmental science & technology*, 46, pp.3253–3262.
- Tilman, D. and Clark, M., 2014. Global diets link environmental sustainability and human health. *Nature*, 515(7528), pp.518-522.
- Tregear, A., 2011. Progressing knowledge in alternative and local food networks: critical reflections and a research agenda. *Journal of Rural Studies*, 27, pp.419–430.
- Vanham, D., Mekonnen, M.m. and Hoekstra, A.Y., 2013. The water footprint of the EU for different diets. *Ecological Indicators*. 32. Pp 1-8.
- Vermeulen, S.J., Campbell, B.M. and Ingram, J.S.I., 2012. Climate Change and Food Systems. *Annual Review of Environment and Resources*, 37, pp.195 -222.
- Vieux, F., Darmon, N., Touazi, D. and Soler, L.G., 2012. Greenhouse gas emissions of self-selected individual diets in France: Changing the diet structure or consuming less?. *Ecological Economics*, 75, pp.91–101.
- Weber, C.L. and Matthews, H.S., 2008. Food-miles and the relative climate impacts of food choices in the United States. *Environmental science & technology*, 42, pp.3508–3513.
- Weller, K. E., Greene, G. W., Redding, C. A., Paiva, A. L., Lofgren, I., Nash, J. T. and Kobayashi, H., 2014. Development and Validation of Green Eating Behaviors, Stage of Change, Decisional Balance, and Self-Efficacy Scales in College Students. *Journal of nutrition education and behavior*, 46(5), pp.324-333.