



Acknowledging complexity in food supply chains when assessing their performance and sustainability



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ABSTRACT

Food supply chains (FSCs) over recent years have been epitomised by a range of concerns such as food and nutrition security, the distribution of value and a growing awareness of the threats posed by climate change. Taken together, these pressures have created a sense of urgency to re-examine the performance, equitability and sustainability of FSCs. This paper argues for the need to acknowledge and access the multiple, contested meanings that are attributed to FSCs. Taking its lead from post-normal science, the approach developed aims to understand the different contexts and account for the 'multiple realities' that exist. Key to this has been the development of a range of attributes of FSC performance that are common across narratives of sustainability and yet framed in various ways by different categories of actors, examined across a range of national contexts and within four spheres of influence. In so doing, this approach has the potential to more widely legitimise knowledge claims regarding FSC performance. This is critical if producers, policy-makers and consumers are to have the cognitive tools to enable them to make informed decisions about the broader impacts of the different FSCs they engage with.

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1. Introduction

Food supply chains (FSCs) over recent years have been epitomised by food price volatility, concerns about food and nutrition security, burgeoning obesity (especially within the Western world), contested energy supplies (most notably the conflict between renewable energy and food production), issues of power, governance and the distribution of value within FSCs, and a growing awareness of the threats posed by climate change (Maye and Kirwan, 2013). Taken together, this confluence of 'intensifying circumstances' (Hinrichs, 2014, p. 144) has created a sense of urgency to re-examine the sustainability, equitability and performance of FSCs. As the source and origin of most food chains, rural areas have been a key focus of agri-food sustainability discussion (Goodman and DuPuis, 2002; Marsden, 1998, 2013). The countryside is also a key site of food consumption, conflict and discursive representation (Halfacree, 2006; Woods, 2012), providing a rich arena in which to examine how sustainability discourses emerge and are contested (cf. Candel et al., 2014). This includes work on new bio-economy and eco-economy models which link food chains, rural space,

regions and states; and reflexive multi-level governance analyses which re-frame relations between the countryside, the city, the region, the city-region, etc (Marsden, 2016). Attention is therefore shifting away from dichotomies such as rural/urban, production/consumption or bio-economy/eco-economy, to identify where systemic change is needed (Sonnino et al., 2016).

Sustainability by definition is a slippery and contested concept with multiple meanings and realities. The starting point then should be to capture the variety of perceptions and discursive framings of sustainability, as key mechanisms that produce social realities and determine agri-food governance (Nally, 2014). The rationale for this is underpinned by the argument that for change to happen 'sustainability transitions' need to be fostered by social action at different levels, with social action, in turn, framed in particular ways (e.g. Geels and Schot, 2007; Hinrichs, 2014; Lachman, 2013; Seyfang and Smith, 2007; Wiskerke and van der Ploeg, 2004). Assessments of sustainability are typically structured in terms of 'assessment frameworks', which prescribe the overall way in which the assessment should be conducted and 'assessment tools', which are the analytical tools used to actually conduct the analyses (Brunori et al., 2016). Sustainability assessments are also inclined to rely on reductionist methodologies and tools; in this respect, there is a tendency to use a single measurement indicator or standard (such as GDP per capita) and to focus on a single dimension (very often the economic dimension) as well as

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a particular scale of analysis (Schader et al., 2014). There is also a propensity to quantify and aggregate the resultant information, principally in response to decision-makers who ask for information that is 'kept simple' (Gasparatos, 2010; Gasparatos et al., 2008).

There are clear and growing concerns that such approaches are failing to provide "reasonable and reliable solutions", and that in order to encompass the complexities and subtleties involved in understanding the sustainability and performance of FSCs "the scientific community [needs] to find new models and paradigms" (Sala et al., 2015, p. 315). For those arguing for a re-examination of the metrics used to assess FSC performance, "business as usual is not an option" (Food Ethics Council, 2013, p. 6). In this respect, that approaches to FSC sustainability need to be more holistic and to incorporate a wider set of performance perspectives than currently is the norm including wellbeing, social justice, health and environmental stewardship (NEF (New Economics Foundation), 2014). These emerging concerns reflect the values of post-normal science, wherein complexity, uncertainty, incomplete data and multiple stakeholder perspectives are explicitly acknowledged (Funtowicz and Ravetz, 1993). Critical also are spatial relations and the socio-economic and geographical context, which can have a significant influence on the perspectives and understandings of those involved (Feldmann and Hamm, 2015; Murdoch, 2006); in this case, in relation to the performance and sustainability of FSCs.

The aim of this paper, therefore, is to develop a new heuristic with which to assess the performance, and thereby sustainability, of FSCs that goes beyond simply the economic to include their capacity to respond to the wider needs and concerns of society. Key to this is an appreciation and understanding of the socio-economic and geographical context in which assessments of performance are made. Drawing on the findings of an EC-funded project (GLAMUR - *Global and local food chain assessment: a multidimensional performance-based approach*), actors' perceptions of performance are examined across four different spheres of debate and communication (public, market, scientific and policy), as well as across five dimensions of food chain performance (economic, social, environmental, health and ethical). In this respect, the three conventional dimensions of FSC performance have been extended to incorporate health and ethics. In the case of health, which might be understood as coming under the heading of 'social' sustainability, increasing links are being made between diet and sustainability and the impact particular FSC configurations can have on health (Brunori et al., 2016). Similarly, while ethics might be understood as a component of all the other dimensions (either implicitly or explicitly – see Kirwan et al., 2017), it is becoming more and more important to understand the ethical and moral intentions of food chain actors in relation to sustainability (FAO, 2016).

The rest of the paper is structured as follows. Section two reviews work on sustainability strategies and the performance of FSC, outlining an alternative methodological framing which analyses FSC sustainability discourses across geographic contexts and spheres. Section three sets out the methodology used, while section four analyses the discourses that emerged from the approach by both geographic context and sphere in relation to the performance of different FSC. The final section of the paper reflects upon the value of this approach to broadening our understanding of the performance and sustainability of FSC.

2. Food supply chain performance and sustainability discourses

Susanne Freidberg, writing in relation to the footprinting of food through its Life Cycle Assessment (LCA), argues that understanding what is meant by sustainable food is critical if companies, policy-makers and consumers are to have the tools to enable them to

make the best possible decisions about the broader impacts of different foods and supply chains that they engage with (Freidberg, 2014). Nevertheless, she cautions that defining what counts as sustainable food in terms of its footprint can become highly political, technical and self-serving (hence her use of the term 'footprint technopolitics'), often dependent on the power relations of those involved; furthermore, that a technically-based approach such as LCA is unable to capture the "breadth of 'political situations' in which measures of sustainable food are contested" (Freidberg, 2014, p. 186). Hinrichs also highlights the need to address issues of power, politics and governance, asking "whose voices and narratives remain unheard" when considering how notions of sustainability are defined in relation to FSC, as well as to what ends (Hinrichs, 2014, p. 151).

Freidberg (2014) introduces an important distinction between *standards* (product or process requirements), and *footprint metrics* (information given to consumers about the sustainability performance of a product). Standards are sets of rules that allow for the classification of a product into a given category. This may require considerable time and effort before the standard is coherent with the legal framework, as well as implemented and accepted by the market. For a firm to create a new standard involves aligning a firm's reputation, certification bodies, public and private control systems, and communication processes around a symbol (e.g. "dolphin-free", or "fair trade"). Once a standard is consolidated, it becomes a 'black box' (Latour, 1987) that encompasses a range of sustainability assessments, giving consumers a product with 'taken for granted' qualities. Footprinting represents a different strategy to standards, in focussing on providing information that enables consumers to freely judge the quality of a product according to their own sensibilities and perspective. With footprinting, consumers are encouraged to interact with firms in order to make sense of the information they receive and thereby to reflect on the implications of their choice. From the firm's perspective, footprinting implies a greater degree of flexibility in the choice of sustainability attributes that they take into consideration. As Friedberg (2014, p. 185) explains, "[t]he product footprint ... governs not just by establishing metrics of comparison and progress. It also identifies 'hotspots' within product life cycles, where measurable environmental impacts and thus potential improvement opportunities are greatest". According to Spence and Rinaldi (2014), in building food chain governance firms develop 'visibility fields', which involves choosing which attributes of a product are to be made visible - and therefore to be measured - and which ones are not. For example, firms may make CO₂ emissions visible yet neglect social inequality.

Sustainability strategies, and in particular footprinting, have raised public interest and participation in assessments of FSC performance and sustainability (Gasparatos, 2010), increasing the range of actors involved in this process as well as the volume of information available. As a result, different approaches and methodologies have become the objects of scientific research, and the meanings of the information gleaned are widely discussed and debated. Such debate encourages all those actors involved to utilise appropriate evaluation tools and to provide more accurate and transparent information, thereby enabling an increased level of legitimacy with respect to the knowledge created (Hassini et al., 2012). As a result of this process, competition between firms moves from costs and prices to knowledge creation and is played out over three levels: the performance of given attributes (for example, CO₂ emissions); standards (setting new and more advanced standards, such as GMO-free); and the reliability of the information provided to justify the chosen standards (Unruh and Ettenson, 2010).

When considering these issues in the context of sustainable consumption policies (Sanne, 2002; Spaargaren, 2003), knowledge

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