

Conceptualising food system governance and its present challenges

by

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Abstract

Many call for radically transforming food systems to reduce climate change and to promote, food security, food safety, environmental sustainability and equity. Food system transformation requires food system governance to deal with the interactions between food production, processing and consumption, in relation with the different drivers of food systems guided by the nutritional, social, environmental and economic outcomes. However, although the structure and complexity of food systems have been widely acknowledged, understanding their governance is only just starting. In this paper we contribute to the literature on food system governance by harnessing the conceptual contributions from multiple system governance frameworks. Based on a literature review we select six conceptual frameworks for this purpose and discuss them further to collect conceptual and practical lessons that may inform efforts to improve food system governance. We conclude that existing frameworks provide important guidance for food system governance do not supply an adequate meta-framework that can simply be translated to the domain of food system governance because they do not address all dimensions relevant for food system transformation. Governing for food system transformation involves more than designing and implementing a new paradigm for future food systems in the most effective way. Understanding current food system governance practices is a basic requirement as well as recognizing that food system transformation is a complex and long-term process involving learning, reflection, dialogues and power struggles. The conceptual tools on system

governance provided from the general literature provide essential guidance for discussing the key challenges in this process.

Keywords: food systems, governance, conceptual frameworks, challenges, transformation

1. Introduction

Without transformations, climate change and resource depletion resulting from food-related activities are expected to increase with 50-90% by 2050, while dietary and health outcomes are projected to worsen (Rockström, Edenhofer, Gaertner, & DeClerck, 2020; Springmann et al., 2018; Swinburn et al., 2019). Avoiding this outcome is critical and therefore many international agencies (e.g. UN Committee on World Food Security (CFS), FAO, UNICEF) are calling for radical interventions (FAO, IFAD, UNICEF, WFP, & WHO, 2019; HLPE, 2017). Conventional agriculture and food policies steered by national political authorities (Candel, 2014) are increasingly considered inadequate to realize this and therefore, many look for a more integrated and coherent way to achieve the fundamental changes needed (e.g. De Brauw et al., 2019; Fanzo, Hunter, Borelli, & Mattei, 2013; Galluzzi, Eyzaguirre, & Negri, 2010; Leach et al., 2020; Ruben, Verhagen, & Plaisier, 2018). These authors call for adopting a food system governance perspective by focusing on the interactions between food production, processing and consumption, in relation with the different drivers of food systems (Béné, Prager, et al., 2019). Such a food system governance arrangement should be guided by the ambition to achieve improved nutritional, social, environmental and economic outcomes (Berkum, Dengerink, & Ruben, 2018). However, apart from general calls for integration, holism, coherence, effectiveness and stakeholder participation, there is little agreement on what food system governance actually entails. There is extensive literature on food governance and food policies (Candel, 2014) as well as on food systems (HLPE, 2017), but food system governance remains a challenge (Hospes & Brons, 2016), despite some recent publications (Delaney et al., 2018; Termeer, Drimie, Ingram, Pereira, & Whittingham, 2018; van Bers et al., 2019). Therefore, further reflection on food system governance is needed (Béné, Prager, et al., 2019; Fresco, 2009; Haddad & Hawkes, 2016). This involves identifying practical solutions for the multiple food system governance challenges, but this also requires further conceptualisation of food system governance. This paper focuses on the second challenge and intends to further our understanding of food system governance with an emphasis on the promotion of transformative change towards sustainability.

The rest of this paper continues in the next section with summarizing key governance challenges in present food systems followed by a reflection on the conceptualisation of food

system governance. In section three, we present the results of a literature review on governance frameworks in the general systems literature and select key conceptual frameworks to discuss in section four their potential contribution to food system governance. Finally, in our conclusion we formulate some guidance for the governance of food system transformations.

2. Challenges to food system governance

Food systems are defined by the High Level Panel of Experts (HLPE) as ‘all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities, including socio-economic and environmental outcomes’ (HLPE, 2017, p. 11). This definition points at the ambition to integrate all agriculture and food-related activities in one single framework. The concept of food systems builds on the broader system literature already advanced in other domains (Bertalanffy, 1972; Rapoport, 1986), such as the environment (Hornberger & Spear, 1981), finances (C. Mayer, 1990) and management (Wilkinson & Dale, 1999). In the case of food, developing and using a systems perspective is relatively new, as shown in the 2017 HLPE report on food systems (HLPE, 2017) and the fast growing number of publications on food systems and food system governance only since 2006 (De Brauw et al., 2019; Delaney et al., 2018; Hospes & Brons, 2016; van Bers et al., 2019) (See Hospes & Brons, 2016). Therefore, as the academic literature on food systems is relatively recent, the literature on food system governance is also only emerging.

Food system governance builds on the general understanding of governance, whereby governance is defined as the range of social processes and practices involved in ‘solving societal problems and creating societal opportunities through interactions among civil, public and private actors’ (Kooiman, Bavinck, Chuenpagdee, Mahon, & Pullin, 2008, p. 17). Food system governance can then be defined as the ‘processes and actor constellations that shape decision-making and activities related to the production, distribution and consumption of food’ (van Bers et al., 2016, p. 10). Food system governance is challenging because it deals with the combination of providing food influencing the everyday lives of all human beings (Parsons & Hawkes, 2018), as well as with addressing the direct and indirect environmental

impacts, while involving many jobs and livelihoods and including equity challenges across international, national and local communities. Food system governance involves complex decision-making processes (Hooghe & Marks, 2003; Stoker, 1998), such as finding synergies and addressing trade-offs (Jessop, 2003) between the different food system elements, within the context of the multi-layers of food systems (local/regional/urban, national, global) and the presence of multiple stakeholders (Béné, Oosterveer, et al., 2019; Dolan & Humphrey, 2000; Henson & Humphrey, 2010; Massoud, Fayad, El-Fadel, & Kamleh, 2010; Micheletti, Stolle, & Follesdal, 2003; Renting, Schermer, & Rossi, 2012; Schilpzand et al., 2010; Scoones, 2009). When considering the ambition to transform food systems (Spaargaren, Oosterveer, & Loeber, 2012), challenges become even more complex (Duit & Galaz, 2008) because of their intense (social and material) spatial and temporal dynamics. Spatial dynamics include mobile social actors and border-crossing material flows (Herring, 2015b; Oosterveer, 2007), in combination with important economic transactions and the global distribution of economic, environmental and social impacts (MacDonald et al., 2015). The temporal dynamics relate in particular to the interactions between the growing (medium-term) demand for food (Herring, 2015a; Nguyen, Morrison, & Neven, 2019; Porkka, Kummu, Siebert, & Varis, 2013) and the need to secure the long-term sustainability of natural ecosystems.

A particular challenge in food systems governance, is the absence of a common vision on what it should aim for. As Béné et al. (2019) showed, there is a shared agreement that present food systems are failing but there is wide divergence on what the causes are for this failure and thus also on what solution should be looked for. Different views on the future of food systems evidently have an impact on the ambitions and organisation of food system governance. It is therefore understandable that in present debates, the focus is on finding practical ways forward, cf. formulating a common view on the future of food systems and selecting the most effective policy instruments to realize this vision. Recent studies include considerations of scale, structure, flexibility and reflexivity (Clancy, 2016), relevant indicators (Delaney et al., 2018), and frameworks for analysing national governance arrangements (Termeer, Dewulf, & Biesbroek, 2017). However, in this debate there is need for further reflection on the conceptualisation of food system governance, particularly on framing, institutions and processes of transformation. Building on the work of Hospes and

Brons (2016) and Van Bers et al. (2019), this paper intends to make a contribution relying on the general literature on systems governance to identify lessons relevant for food system governance.

3. Frameworks for systems governance in different domains; a literature review

Through a literature review, we identified system-focused sustainability governance frameworks which we argue can inform food system governance. We searched articles published between 1987 (the year the Brundtland Report made a first global call for a systemic perspective for environmental and social sustainability; (WCED, 1987)) and 2019. We searched publications in SCOPUS and the Web-of-Knowledge databases using a title search algorithm⁴ to select articles using system-focused governance frameworks but excluding those using simulations and models. We collected 1033 documents and then filtered out documents that i) had no abstract, ii) were a forum discussion, brief commentary or editorial, iii) were focusing on corporate finance (banking, international finance), hospital management, medicine (e.g. cardiology, psychiatry) or specific fields such as electric engineering and astronomy. We then reviewed the abstracts of the remaining documents (n = 628), resulting in a subset (n = 325) that mentioned the use of a specific governance framework in their abstract. These governance frameworks were summarised, leading to the identification of six major frameworks and for each of these we selected and reviewed the key conceptual publications (Table 1), a selection based on the number of their citations.

TABLE 1: Governance Analytical Frameworks

Analytical framework	Key reference	Citations*	Focus
<i>Governance of Social-ecological systems (SES)</i>	Ostrom 2009	3627	Formal and informal institutions and authorities, their dynamic interaction with the bio-physical resource systems and the emergence of institutions for sustainable development.

⁴ "policy instrument" OR "Policyframework" OR "Governance" AND "integrat*" OR "system" OR "mix" AND NOT "model*" OR "simulat*"

Network Governance (NG)	Provan and Kenis 2008	2959	Interactions between inter-dependent nodes and forms of network governance
Transition theory (TT)	Geels and Schot 2007	2694	Analysis of socio-technical regime shifts using three-levels Multi-level perspective (MLP): 1) Niches, dynamic, rapidly changing, institutionally-protected spaces that allow for technical and social innovations to mature; 2) Regimes, characterized by locked-in mechanisms, existing institutions, incentives and interests; 3) Landscapes, characterized by longer timeframes including processes that cannot be controlled by stakeholders (e.g. climate change, changes in societal values, etc.) but that can influence niche-regime interactions.
Multi-level Governance (MLG)	Hooghe and Marks 2003	2387	Distribution of public authority across different jurisdictional levels and related coordination dilemmas.
Environmental Policy Integration (EPI)	Lafferty and Hovden 2003	583	Integration of environmental sustainability across policy domains, challenges to integrate different public policies to achieve environmental goals.
Meta-Governance (MG)	Kooiman and Jentoft 2009	258	The analysis of the “governance of governance” referring to the multi-actor processes that define the rules regulating their inter-actions when dealing with a particular problem.

*Citations Google Scholar 7 May 2019

Source: this study

In the following sub-sections, we discuss these frameworks with respect to their potential contribution to addressing the key challenges of food system governance.

Among the many different challenges, we selected the following three critical ones from a food systems perspective. First, the scales at which food systems are being defined and how cross-scale dynamics can be dealt with (MacDonald et al., 2015; Oosterveer, 2007). This

raises the questions of defining food system boundaries and dealing with multilevel dynamics. A second challenge relates to the dynamics of time and space (Gómez & Ricketts, 2013; Herring, 2015a). This, in turn, raises questions about how to deal with feedback and the distributive impacts of different interventions. A third challenge is the problem of institutional integration (Lang, 2009; Risse, 2011). Because food systems include many different actors as well as several critical issues, multiple institutions need to collaborate. This raises questions about authority and legitimacy as well as about coordination to create integrated food systems governance.

3.1. Social-ecological systems (SES)

The social-ecological systems (SES) framework (Ostrom, 2009) focuses attention on the co-evolving dynamics within natural resources' systems and within users' systems. The framework points at the need to explicitly include ecosystems' functioning in food systems governance, while carefully considering the different degrees of natural resource dependency between various groups of users.

Such dynamics between natural ecosystems and social systems is also relevant for food systems (Cumming, Cumming, & Redman, 2006). Natural ecosystems evolve over geological times to which, until recently, food systems had to adjust their resource extraction. However, in contemporary food systems, natural resource dynamics are often considered subordinate as food system actors tend to exploit natural resources at rates higher than their regeneration (Smith et al., 2016). In terms of governance, this means that social actors generally prioritize short-term benefits over the longer-time benefits of natural ecosystem conservation and the sustainable extraction of their benefits (Frederick, Loewenstein, & O'Donoghue, 2002). Different food system actors may have different ways of dealing with this tension, as for instance, the livelihood of some depends on the well-functioning of the natural resources system to which they are bounded, while others are able to move elsewhere when natural resources are depleted (Burgers & Susanti, 2011; Hall, 2011; Margulis, McKeon, & Borras, 2013).

3.2. Network Governance

The network governance (NG) framework draws particular attention to the need for legitimacy of different governance actors and the various ways of this being granted. The framework provides conceptual tools to describe, diagnose and address the functioning of actor networks and offers a typology of different forms of network governance. Actor networks are understood as interconnected (groups of) actors engaging in open-ended but socially-binding forms of coordination to achieve goals that each of them cannot achieve on their own (Jones, Hesterly, & Borgatti, 1997; Provan & Kenis, 2008). The emergence of the NG framework was motivated (Jones et al., 1997) by the complexity of supplying products and services which require complementary competencies and rapid exchange of tacit knowledge across multiple nodes.

Food trade, food safety and food security policies in modern food systems are set in the context of large networks involving producers, private companies, consumers, NGOs, state authorities, media and experts whereby state authorities significantly influence and enforce relevant decisions and actions (Oosterveer, 2007). In the NG framework, authority and legitimacy are critical issues (Oosterveer, 2015). For instance, the authority to legitimately govern food systems is not assured for all actors, whereby legitimacy is defined as the “generalized perception that the actions of a network are desirable, proper, or within some system of norms, values, beliefs, and definitions” (Provan, Kenis, & Human, 2008, p. 12). Authority in actor networks is much more dispersed and therefore the legitimacy of different governance actors and their interventions requires active building. Internal legitimacy is important to ensure that the food systems’ actors engaged in the network identify and share the network’s goals. External legitimacy helps the network interact with other networks and seek support from the wider public. Tensions around legitimacy may arise as actors have to balance their wish to maintain their particular values and identity (e.g. corporate reputation; (Yeoman & Santos, 2019) with their need to engage with larger networks (to achieve the desired outcomes).

Combining public and private governance actors and instruments also raises questions about their authority and legitimacy. Contrary to the formal procedures of democratic processes and nation-state legal structures which create input legitimacy, private governance arrangements rely more on legitimacy derived from their (intended) output (Oosterveer, 2015). Private initiatives may claim to respond to public concerns and their effective response

provides the basis for their legitimacy. However, Follesdal (2011) argues that the inclusion of stakeholders in networks is selective while mechanisms to be subjected to a form of accountable representation are often absent.

As NG literature suggests, trust and (implicit or explicit) agreement to achieve common goals through a given collaborative structure are important determinants of network legitimacy. This may be challenging when actors have little experience in collaborating across scales and sectors. Even more so, when, with the increasing size of the network through globalization and global environmental and nutritional ambitions, creating and maintaining a common identity to provide internal and external legitimacy in food system governance demands active interventions.

3.3. Transition Theory (TT)

The transition theory (TT) framework strongly argues that food systems transformation is not a matter of upscaling promising innovations but requires a much more integrated and systemic approach based on adequate understanding of the dynamics involved. The framework addresses the temporal dynamics of structural system transformation (Geels, 2011) with a focus on the role of regimes and niches. TT points at the temporal alignment or misalignment between the maturity of a system innovation at the niche level and the window of opportunity to transform the system as a whole (or ‘the regime’ in TT terms). In other words, by focusing on the timing in the interaction between niche and regime, attention is given to finding the moment when a governance effort may be effective in combining the maturity of the innovation, the opportunities of wider social pressure and the transformation of the system as a whole. An innovation (e.g. new technology, ideas, new framings of problems, etc.) can be considered mature if i) learning processes for its uptake are well established, ii) these are supported by powerful actors, and iii) there is evidence of and expectation for further improvement and sufficient adoption in the system (Geels & Schot, 2007). Different institutions and societal actors can contribute to secure these conditions. To enhance the wider social pressure and the sense of urgency to create a system transformation, governance actors might engage in coordinating niche-innovations with users and larger societal groups and in combining piloting prototypes and communication and learning processes.

In the case of food system governance, a typical mismatch in the interaction between niches and the incumbent regime is the presence of different temporal orientations among societal groups in their response to innovations and landscape pressures. Dominant system actors may be slower at responding to pressures resulting from innovations and changes in societal values (Geels & Schot, 2007). Broad stakeholder perception of urgency is key when opening up opportunities for niche innovations that can improve food system outcomes but this requires prompt action and long term commitment.

The case of organic food (Sahota, 2009; Smith et al., 2016; Spaargaren et al., 2012) may illustrate the importance of temporal dynamics in food system transformation. The expansion of organic food provision has been spurred by increasing pressure from consumers to take urgent action for improving human health and environmental sustainability and was incorporated into the dominant regime by powerful actors in food retailing (i.e. supermarkets) (Reardon & Hopkins, 2006; Spaargaren et al., 2012). Thus, collective actions can be among the strongest determinants of food system change, especially if occurring in the context of sufficient resource availability and broad institutional support (van Bers et al., 2019) and with the “awareness, engagement and ownership” of stakeholders (Kirwan, Ilbery, Maye, & Carey, 2013, p. 836).

3.4. Multi-level governance (MLG)

The multi-level governance (MLG) framework shows how locating authority is critical in the governance of food systems because of their multi-level nature and the competing demands for effectiveness, legitimacy and accountability. The framework provides relevant insights in addressing cross-scale system dynamics (Hooghe & Marks, 2003; Piattoni, 2009). MLG is paying particular attention to two tensions in locating authority across scales. First, the tension between the national state and sub-national levels in governing local externalities. Second, the tension between the national state and international levels as the former is mandated to protect its citizens against the negative externalities from international activities (Keleman, Hellin, & Bellon, 2009) but is bounded by international regulations when doing so. These tensions across scales happen in a context where private actors and civic organizations are becoming increasingly influential. For instance, in international food

regimes, private actors coordinate “parallel power networks that avoid international anarchy by by-passing the nation states” (Jessop, 2003, p. 31; see also Swinburn et al., 2019).

Ideally, authority is located at the level that can most effectively respond to citizens’ interests and concerns regarding externalities associated to a specific public service provider (Hooghe & Marks, 2003). The literature on MLG suggests that locating authority at the most effective level means considering both effective institutional design and accountability. Locating authority at a higher administrative level can be effective in governing externalities of public service provision but runs the risk of being disconnected from the local reality and imposing “blue-print” interventions on socially and ecologically diverse localities, thereby losing accountability. Two options are available to address these tensions. First, locating the jurisdictional authority for cross-scale coordination within the existing hierarchical administrative arrangements (e.g. national government, province, municipality); or, second, defining authority around a specific policy issue with overlapping membership from different governance levels.

3.5. Environmental Policy Integration (EPI)

The environmental policy integration (EPI) framework points at the importance of changing the process of sectoral policy making and to secure integrated and coherent policies that guide the transition towards sustainability. The framework also underlines the opportunities for integrating different food system governance domains.

To realize these ambitions in the case of food system governance EPI offers three lessons (Jordan & Lenschow, 2010). First, innovative governance efforts should adopt strategies that help understand possible resistance to change among representatives of different sectors in society. Second, the different policy domains relevant for food system governance should be bridged while taking into account existing differences in professional language and values that forge different narratives between key agents. Third, interventions should be context-specific and build on existing leadership, institutional structures and policy cultures. Bouwma et al. (2018) suggest that new ideas i) are more easily included in general policy statements than in specific legislation and even less where segregated sectoral approaches tend to persist; ii) must be iterated thoroughly and over time; and iii) need leadership for promotion at different levels of government. Bouwma et al. (2018) also argue that in order

to be successful across sectors, policy-champions and policy-entrepreneurs should communicate the benefits of adopting new ideas using framings tailored to the audience of those sectors.

3.6. Meta-Governance (MG)

The meta-governance (MG) framework focuses on the values, norms and principles that underlie the design of governance processes (e.g. interactions in rule setting, location of authority, etc.) (Kooiman & Jentoft, 2009). The framework underlines that addressing trade-offs and synergies in system governance is not a straightforward administrative process but requires culturally-embedded processes to ensure transparency, reflexivity and a certain level of agreement on the values, principles and norms underlying the policy choices.

Reflecting on the underlying values, principles and norms can guide the design of a governance arrangement that addresses system trade-offs. Values are “the most general and fundamental notions” which reflect a general view about the ethical importance of key concepts in public debate. Norms and principles can be “founded on general notions of what is right or wrong” (Kooiman & Jentoft, 2009, p. 824). Norms are related to the concept of what is generally considered just in the governance process when addressing trade-offs while principles guide what rule(s) are acceptable in making concrete choices when trade-offs are considered.

MG literature suggests that the less the underlying values guiding governance actors are measurable or comparable, the harder it becomes to make choices. From a normative perspective, the key assumption is that failure of governance interventions is much less probable when the values, norms and principles that guide stakeholders’ judgements are made explicit and allowed to inform a reflexive process. Such a reflexive process facilitates understanding stakeholders’ values and assessing to what extent they are comparable and commensurable, which determines whether choosing a particular solution will be easy, moderate or difficult (Kooiman & Jentoft, 2009).

Governments can play an important role by adopting a reflexive process in the design of regulations, and by supporting the creation and maintenance of social capital and social networks. Governments can do so by gathering information and monitoring governance outcomes, and, depending on their normative mandate, ensuring power redistribution through

negotiations among actors (Jessop, 2003). However, whether or not a reflexive meta-governance approach to system-governance can be adopted depends on the willingness of governments and other actors to engage and address complex problems in a transparent, inclusive and reflexive manner. This willingness differs depending on the institutional culture of a country, the extent to which pre-existing conditions facilitate consensus building processes (e.g. collaborative experience, trust, conflict, etc.), the presence of adequate leadership, expectations and capacities for engaging with civil society and the private sector, and, finally, the type of problem (Ansell & Gash, 2007; Béné, Oosterveer, et al., 2019; Gillespie, van den Bold, & Hodge, 2019).

4. Discussion

The need for an effective food system governance towards transition is widely recognized but the current debate on what this entails remains restrained. The debate is dominated by concrete questions such as ‘what should the new paradigm look like?’, ‘what is the best participatory approach to change the dominant food system?’, and ‘what is the most effective way to scale up promising innovations’ (Pitt & Jones, 2016). In this paper we intend to broaden the debate by reviewing the wider academic literature on system governance to identify potential contributions from existing system governance frameworks.

The different system governance frameworks discussed a number of critical issues that seem relevant for food system governance. The SES framework underlines how ecosystem dynamics fundamentally differs from social system dynamics which results in incongruous interactions between the two. Food system governance should recognise these different dynamics and the resulting tensions when trying to coordinate and integrate the two. The NG framework draws attention to the need for internal and external legitimacy in the governance of networks. This is a critical challenge for food system governance because of the multiple and sometimes competing outcomes aimed for and the broad range of stakeholders involved. The TT framework contributes through its focus on the temporal dimensions of system change. The framework shows how niches do not automatically replace dominant practices even when they are technically, economically or socially superior. The interactions between niche and regime, the presence of a window of opportunity and the pressure from key stakeholders are all key-determinants in this transition process. The contribution from the

MLG framework is the realization that food system governance takes place at different levels, involving a range of decision makers and stakeholders and therefore needs multiple governance arrangements operating at different scales. Identifying appropriate levels of food system governance and arranging their mutual interactions is critical as effectiveness and accountability are not always easily merged. The EPI framework shows how sustainable development requires the integration of different, often competing, policy domains as well as what challenges are involved when doing so. Effective integration needs careful communication between different forms of expertise and can be done best through concrete and specific challenges rather than through more general and abstract policy debates. Finally, the MG framework takes the debate to another level, namely the fundamental values guiding system governance, contained in the system's paradigm. The framework shows how important this is, also for food system governance, in terms of translating principles into practice as well as in terms of how this should be done.

These different governance frameworks present an interesting range of challenges and instructions for food system governance. We consider however two critical issues insufficiently addressed by them, which are the role of paradigms and the role of power. Paradigms confirm the identity of systems and influence their interactions with other systems. Paradigms are the 'deepest set of beliefs about how' a system works (based on: Meadows, 1999, p. 17). A paradigm guides stakeholders' perspectives and their ways of doing, as the MG framework already underlined. Changing the dominant paradigm in system governance poses therefore significant challenges. As transition theory shows, changing a dominant paradigm is faced with resistance (Geels, 2014) because routinised ways of doing that are well-embedded in existing institutions are not easy to change (lock-ins). The concept of path dependency captures the resistance to change and innovations as a result of the influence that previous system states exert on present and future states (Kay, 2005; Rotmans & Loorbach, 2009). Paradigms in food systems have been embedded in strong institutions and are therefore hard to change (de Krom & Muilwijk, 2019; Kay, 2005). Although, in recent years alternative paradigms on sustainable food systems are increasingly being advocated by different actor networks, changing the dominant paradigm change remains difficult (Bush, 2010; Kuokkanen, Mikkilä, Kuisma, Kahiluoto, & Linnanen, 2017; Parker & Johnson, 2019). Evidence suggests that even in countries where sustainable food system

innovations have been put high on the political agenda and are inserted in institutional structures, “business as usual” and “technological optimism” narratives still continue to dominate the debate (de Krom & Muilwijk, 2019; Thompson & Scoones, 2009). Food system governance therefore involves a struggle between different food system paradigms. Understanding the struggle between different paradigms requires an analysis of the underlying power struggles. However, these governance frameworks discussed in this paper hardly address power dynamics in system governance. Food system governance involves power struggles (Anderson, Bruil, Chappell, Kiss, & Pimbert, 2019; De Schutter, 2017; El Bilali, 2019; Leach et al., 2020), not only based on unequal access to economic and administrative resources but also differences in access to information embedded in (global) flows and networks (Castells, 2009; Mol, 2010) and in cultural concerns (Béné et al., 2020). A political-economic analysis of previous food system governance dynamics (Pereira, Drimie, Maciejewski, Tonissen, & Biggs, 2020), including of the key role played by the national state (F. W. Mayer & Phillips, 2017) is needed to provide crucial lessons for dealing with different forms of power in contemporary food system governance.

Such a more complete conceptualisation of food system governance may contribute to reflecting on perspectives for food system transformation. Together the conceptual frameworks, discussed in this paper, underline that governing food systems for transformation is a complex, non-linear process of disruptive change over a period of several decades (Loorbach, Frantzeskaki, & Avelino, 2017) that involves learning, reflection, dialogues and power struggles engaging a range of different stakeholders, and addressing social and material dynamics. In particular, they challenge the more simple understandings of the transition process that focus on effectiveness and efficiency by building on standard models of policy making. Therefore, the following five critical points on food system governance and their transformation may be distilled from this review.

First, it is important to remain cognisant of the social dimensions of food systems, which means that food system boundaries are socially constructed. Systems and their boundaries are ‘shaped by [mixtures] of regulative and governance arrangements; cultural-cognitive conceptions of identity and a sense of “being in the same boat”; normative and ethical frameworks that provide common rules and standards; and interdependencies borne of technical connections or dependence on similar types of material resources’ (Dacin,

Goodstein, & Scott, 2002, p. 51) (See also Eakin, Rueda, & Mahanti, 2017). Second, food systems exist in very different forms and this diversity of food systems (Gaitán-Cremaschi et al., 2018) means that a one-size-fits-all approach to governing them is not possible. As a consequence, addressing the question of how to face the challenge that multiple viable pathways towards food system transformations exist (Scoones et al., 2020) does not lead to a simple response. The existence of multiple pathways does not mean that they are all equally feasible (Weber et al., 2020), neither is choosing between them straightforward. Third, food systems function in the broader context of globalisation (Oosterveer & Sonnenfeld, 2012), which means that different parts of food systems are linked across large distances in terms of material connections as well as in governance (Lenschow, Newig, & Challies, 2016; Newig, Challies, Cotta, Lenschow, & Schilling-Vacaflor, 2020). As a consequence, network forms of governance are needed to deploy specific (locally-tailored) responses for which innovative and alternative forms of governance need developing (Eakin et al., 2017). As decisions in one place may have consequences at other, distant places, creating a material connectivity, a similar connectivity should be aimed for in terms of governance. For instance, sustainability standards should not be designed unilaterally from the consumer point of view but also incorporate producer concerns (Hatanaka, Bain, & Busch, 2005). Fourth, food systems consist of multiple subsystems with various feedback loops and connections (Candel & Biesbroek, 2018; Malhi et al., 2009) and acquiring deep understanding of this dynamics is a necessary condition for their governance. For example, promoting sustainability by reducing food waste and losses requires in-depth knowledge of the different parts of the food system and their connections to identify opportunities for the prevention, reduction and reuse of food waste (Papargyropoulou, Lozano, K. Steinberger, Wright, & Ujang, 2014). Fifth and final, there is at present no coherent set of broadly recognized appropriate policy incentives and institutional arrangements in food system governance (Burchi, Fanzo, & Frison, 2011) and as a result there is a range of different formal and informal governance practices (public, private and public-private) (Brouwer, McDermott, & Ruben, 2020) that steer food systems towards a range of different, sometimes competing, goals. Developing a more coherent set of food system governance arrangements would increase the effectiveness resulting from their interventions.

Current debates on food system governance are guided by the call for fundamental change; the need for achieving food systems transformations (Béné, Oosterveer, et al., 2019; Willett et al., 2019). Food systems are complex adaptive systems that need ‘governance systems that simultaneously produce high levels of collective action and learning’ (Duit & Galaz, 2008, p. 329). Food systems governance involves multiple actors dealing with the permanent tensions between stability and change (Loorbach et al., 2017). Governing food system transformations is therefore not a managerial process with a clear beginning and end that could fit a pre-defined model. It is a continuous and long-term process requiring an in-depth understanding of food system dynamics, in particular acknowledging the presence of pluralist understandings of causality (‘as a web of interlocking factors’ (Middlemiss, 2018, p. 207), and the different stakeholders involved. Governing food system transformations thus needs a willingness to reflect on interventions and their impacts in order to learn from experiences and adapt ways to achieve intended outcomes. The nonlinearity and unknown feedback loops in food systems mean that food system governance for transformation requires flexibility among the governance actors as well as strengthening governance capabilities through learning (Termeer, Dewulf, Breeman, & Stiller, 2015) and reflexivity (Grin, 2006; Neufeldt et al., 2013). As Candell (2014), Hinrichs (2010) and Van Bers (2019) suggest, analysing previous and existing practices and experiences in food systems governance and change may deliver important lessons for future strategies.

Our review of system governance frameworks may provide important guidance for food system governance but does not address all dimensions of food system transformation. Governance for food system transformation is a political process (Gillespie et al., 2019; Meadowcroft, 2007; Scoones et al., 2020; Swinburn, 2019) and therefore there is no guarantee that an inclusive participatory debate on the ultimate goal of food systems will result in a shared vision of the required transformation and how this should be implemented (Caron et al., 2018). The increasing involvement of a growing number of stakeholders, who take up new roles in food democracy (Díaz-Méndez & Lozano-Cabedo, 2020) creates the risk of fragmentation and competing initiatives (Heidingsfelder & Beckmann, 2019). The call for food systems transformations therefore raises fundamental questions about steering, inclusivity, reflexivity, equity and power, as well as about engaging with the socio-technological dynamics in food systems.

5. Conclusion

This paper has reviewed the academic literature on system governance to identify critical issues for governing food systems. These critical issues can be summarised in the following three lessons.

First, governing food systems towards sustainability is a long term dynamic process of change requiring adequate authority, leadership and legitimacy while involving a broad range of stakeholders. Reflection and learning are key elements in this governance process. Critical stakeholders that need to be included are the hundreds of millions producers and the billions of food consumers. Governance of food systems, like for all socio-techno-ecological systems, have to manage the tensions between continuity and change in the context of social technological and environmental dynamics, influenced by unequal power distribution and environmental challenges.

Second, food systems transform not simply by promoting and scaling up promising innovations. Success of socio-techno-ecological innovations does not depend only on their quality but also on their fit in the wider food system and on the possibilities for accommodating them. Food system governance for change should therefore balance their engagement with the innovation and with transforming the wider (system) context.

Third, the literature on system governance makes clear that food system governance for transformation should not only focus on general paradigms and the most effective translation of UN's SDGs into practice but also consider more fundamental governance challenges. Questions of legitimacy, accountability and authority in addressing temporal and spatial dynamics, are equally relevant to successfully govern our present food systems. As well as the capacity to reflect on ongoing governance dynamics, develop appropriate governance instruments and implement them in the context of a growing number of competing food governance initiatives.

References

- Anderson, C. R., Bruil, J., Chappell, M. J., Kiss, C., & Pimbert, M. P. (2019). From Transition to Domains of Transformation: Getting to Sustainable and Just Food Systems through Agroecology. *Sustainability*, *11*(19).
- Ansell, C., & Gash, A. (2007). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, *18*(4), 543-571. doi:10.1093/jopart/mum032
- Béné, C., Fanzo, J., Haddad, L., Hawkes, C., Caron, P., Vermeulen, S., . . . Oosterveer, P. (2020). Five priorities to operationalize the EAT–Lancet Commission report. *Nature Food*, *1* 457–459 Retrieved from <https://www.nature.com/articles/s43016-020-0136-4>
- Béné, C., Oosterveer, P., Lamotte, L., Brouwer, I. D., de Haan, S., Prager, S. D., . . . Khoury, C. K. (2019). When food systems meet sustainability – Current narratives and implications for actions. *World Development*, *113*, 116-130. doi:<https://doi.org/10.1016/j.worlddev.2018.08.011>
- Béné, C., Prager, S. D., Achicanoy, H. A., Toro, P. A., Lamotte, L., Cedrez, C. B., & Mapes, B. R. (2019). Understanding food systems drivers: A critical review of the literature. *Global Food Security*, *23*, 149-159.
- Berkum, S. v., Dengerink, J., & Ruben, R. (2018). *The food systems approach: sustainable solutions for a sufficient supply of healthy food*. Retrieved from The Hague: <http://edepot.wur.nl/451505>
- Bertalanffy, L. V. (1972). The History and Status of General Systems Theory. *Academy of Management Journal*, *15*(4), 407-426. doi:10.5465/255139
- Bouwma, I., Schleyer, C., Primmer, E., Winkler, K. J., Berry, P., Young, J., . . . Vadineanu, A. (2018). Adoption of the ecosystem services concept in EU policies. *Ecosystem Services*, *29*, 213-222. doi:<https://doi.org/10.1016/j.ecoser.2017.02.014>
- Brouwer, I. D., McDermott, J., & Ruben, R. (2020). Food systems everywhere: Improving relevance in practice. *Global Food Security*, *26*, 100398. doi:<https://doi.org/10.1016/j.gfs.2020.100398>
- Burchi, F., Fanzo, J., & Frison, E. (2011). The Role of Food and Nutrition System Approaches in Tackling Hidden Hunger. *International Journal of Environmental Research and Public Health*, *8*(2), 358-373. Retrieved from <https://www.mdpi.com/1660-4601/8/2/358>
- Burgers, P., & Susanti, A. (2011). The Focus: Food security and land grabbing; A new equation for oil palm & Food, energy and climate policies in Riau Province, Indonesia. *IIAS The Newsletter*, *58*(Autumn/Winter 2011), 22-23.
- Bush, R. (2010). Food Riots: Poverty, Power and Protest1. *Journal of Agrarian Change*, *10*(1), 119-129. doi:10.1111/j.1471-0366.2009.00253.x

- Candel, J. J. L. (2014). Food security governance: a systematic literature review. *Food Security*, 6(4), 585-601. doi:10.1007/s12571-014-0364-2
- Candel, J. J. L., & Biesbroek, R. (2018). Policy integration in the EU governance of global food security. *Food Security*, 10(1), 195-209. doi:10.1007/s12571-017-0752-5
- Caron, P., Ferrero y de Loma-Osorio, G., Nabarro, D., Hainzelin, E., Guillou, M., Andersen, I., . . . Verburg, G. (2018). Food systems for sustainable development: proposals for a profound four-part transformation. *Agronomy for Sustainable Development*, 38(4), 41. doi:10.1007/s13593-018-0519-1
- Castells, M. (2009). *Communication Power*. Oxford: Oxford University Press.
- Clancy, K. (2016). Digging deeper: Bringing a Systems Approach to Food Systems: A Different Way To Approach Policy Change. . *Journal of Agriculture, Food Systems, and Community Development*, 4(4), 9–11. doi:<https://doi.org/10.5304/jafscd.2014.044.010>
- Cumming, G. S., Cumming, D. H. M., & Redman, C. L. (2006). Scale Mismatches in Social-Ecological Systems Causes, Consequences, and Solutions. *Ecology and Society*, 11(1). Retrieved from <http://www.jstor.org/stable/26267802>
- Dacin, T. M., Goodstein, J., & Scott, R. W. (2002). Institutional theory and institutional change: Introduction to the special research forum. *Academy of Management Journal*, 45(1), 45-56.
- De Brauw, A., Brouwer, I. D., Snoek, H., Vignola, R., Melesse, M. B., Lochetti, G., . . . Ruben, R. (2019). *Food system innovations for healthier diets in low and middle-income countries* (Vol. 1816): Intl Food Policy Res Inst.
- de Krom, M. P., & Muilwijk, H. (2019). Multiplicity of perspectives on sustainable food: Moving beyond discursive path dependency in food policy. *Sustainability*, 11(10), 2773.
- De Schutter, O. (2017). The political economy of food systems reform. *European Review of Agricultural Economics*, 44(4), 705-731.
- Delaney, A., Evans, T., McGreevy, J., Blekking, J., Schlachter, T., Korhonen-Kurki, K., . . . Rist, S. (2018). Governance of food systems across scales in times of social-ecological change: a review of indicators. *Food Security*, 10(2), 287-310. doi:10.1007/s12571-018-0770-y
- Díaz-Méndez, C., & Lozano-Cabedo, C. (2020). Food governance and healthy diet an analysis of the conflicting relationships among the actors of the agri-food system. *Trends in Food Science & Technology*, 105, 449-453. doi:<https://doi.org/10.1016/j.tifs.2019.08.025>
- Dolan, C., & Humphrey, J. (2000). Governance and Trade in Fresh Vegetables: The Impact of UK Supermarkets on the African Horticulture Industry. *Journal of Development Studies*, 37(2), 147 - 176. Retrieved from <http://www.informaworld.com/10.1080/713600072>

- Duit, A., & Galaz, V. (2008). Governance and Complexity—Emerging Issues for Governance Theory. *Governance*, 21(3), 311-335. doi:10.1111/j.1468-0491.2008.00402.x
- Eakin, H., Rueda, X., & Mahanti, A. (2017). Transforming governance in telecoupled food systems. *Ecology and Society*, 22(4).
- El Bilali, H. (2019). Research on agro-food sustainability transitions: A systematic review of research themes and an analysis of research gaps. *Journal of Cleaner Production*, 221, 353-364. doi:<https://doi.org/10.1016/j.jclepro.2019.02.232>
- Fanzo, J., Hunter, D., Borelli, T., & Mattei, F. (Eds.). (2013). *Diversifying food and diets: using agricultural biodiversity to improve nutrition and health*. London and New York: Routledge.
- FAO, IFAD, UNICEF, WFP, & WHO. (2019). *The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns*. Retrieved from Rome:
- Føllesdal, A. (2011). The Legitimacy Challenges for New Modes of Governance: Trustworthy Responsiveness. *Government and Opposition*, 46(1), 81-100. doi:10.1111/j.1477-7053.2010.01331.x
- Frederick, S., Loewenstein, G., & O'Donoghue, T. (2002). Time Discounting and Time Preference: A Critical Review. *Journal of Economic Literature*, 40(2), 351-401. doi:10.1257/002205102320161311
- Fresco, L. O. (2009). Challenges for food system adaptation today and tomorrow. *Environmental Science & Policy*, 12(4), 378-385. Retrieved from <http://www.sciencedirect.com/science/article/B6VP6-4V995Y6-1/2/cd1fc6ee4918be7e8624f101a3d75dd9>
- Gaitán-Cremaschi, D., Klerkx, L., Duncan, J., Trienekens, J. H., Huenchuleo, C., Dogliotti, S., . . . Rossing, W. A. H. (2018). Characterizing diversity of food systems in view of sustainability transitions. A review. *Agronomy for Sustainable Development*, 39(1), 1. doi:10.1007/s13593-018-0550-2
- Galluzzi, G., Eyzaguirre, P., & Negri, V. (2010). Home gardens: neglected hotspots of agrobiodiversity and cultural diversity. *Biodiversity and Conservation*, 19(13), 3635-3654. doi:10.1007/s10531-010-9919-5
- Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions*, 1(1), 24-40. doi:<http://dx.doi.org/10.1016/j.eist.2011.02.002>
- Geels, F. W. (2014). Regime Resistance against Low-Carbon Transitions: Introducing Politics and Power into the Multi-Level Perspective. *Theory, Culture & Society*, 31(5), 21-40. doi:10.1177/0263276414531627

- Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. *Research Policy*, 36, 399-417.
- Gillespie, S., van den Bold, M., & Hodge, J. (2019). Nutrition and the governance of agri-food systems in South Asia: A systematic review. *Food Policy*, 82, 13-27. doi:<https://doi.org/10.1016/j.foodpol.2018.10.013>
- Gómez, M. I., & Ricketts, K. D. (2013). Food value chain transformations in developing countries: Selected hypotheses on nutritional implications. *Food Policy*, 42, 139-150. doi:<https://doi.org/10.1016/j.foodpol.2013.06.010>
- Grin, J. (2006). Reflexive modernisation as a governance issue, or: designing and shaping re-structuration. In J.-P. Voss, Direk Bauknecht and René Kemp (Ed.), *Reflexive Governance for Sustainable Development* (pp. 57-81). Cheltenham and Northampton: Edward Elgar.
- Haddad, L., & Hawkes, C. (2016). A new global research agenda for food. *Nature*, 540, 30-32.
- Hall, R. (2011). Land grabbing in Southern Africa: the many faces of the investor rush. [Review of African Political Economy]. *Review of African Political Economy*, 38(128), 193-214. doi:10.1080/03056244.2011.582753
- Hatanaka, M., Bain, C., & Busch, L. (2005). Third-party certification in the global agrifood system. *Food Policy*, 30, 354-369.
- Heidingsfelder, J., & Beckmann, M. (2019). A governance puzzle to be solved? A systematic literature review of fragmented sustainability governance. *Management Review Quarterly*. doi:10.1007/s11301-019-00170-9
- Henson, S., & Humphrey, J. (2010). Understanding the Complexities of Private Standards in Global Agri-Food Chains as They Impact Developing Countries. [The Journal of Development Studies]. *The Journal of Development Studies*, 46(9), 1628-1646. doi:10.1080/00220381003706494
- Herring, R. J. (2015a). How is Food Political? Market, State and Knowledge. In R. J. Herring (Ed.), *The Oxford Handbook of Food, Politics, and Society*. (pp. 3-40). Oxford: Oxford University Press.
- Herring, R. J. (Ed.) (2015b). *The Oxford Handbook of Food, Politics, and Society* Oxford: Oxford University Press.
- Hinrichs, C. (2010). Conceptualizing and Creating Sustainable Food Systems: How Interdisciplinarity can help. In A. Blay-Palmer (Ed.), *Imagining sustainable food systems: theory and practice* (pp. 17 - 36). Franham: Ashgate.
- HLPE. (2017). *Nutrition and food systems*. Rome: The High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security.

- Hooghe, L., & Marks, G. (2003). Unraveling the Central State, but How? Types of Multi-level Governance. *American Political Science Review*, 97(2), 233-243. doi:10.1017/s0003055403000649
- Hornberger, G. M., & Spear, R. C. (1981). An Approach to the Preliminary Analysis of Environmental Systems. *Journal of Environmental Management*, 12, 7-18.
- Hospes, O., & Brons, A. (2016). Food system governance. A systematic literature review. In A. Kennedy & J. Liljeblad (Eds.), *Food Systems Governance. Challenges for justice, equality and human rights* (pp. 13-42). London: Routledge.
- Jessop, B. (2003). Governance and meta-governance: on reflexivity, requisite variety and requisite irony. In H. Bang (Ed.), *Governance as social and political communication* (pp. 101-116). Manchester: Manchester University Press.
- Jones, C., Hesterly, W. S., & Borgatti, S. P. (1997). A General Theory of Network Governance. *Academy of Management Review*, 22(4), 9.
- Jordan, A., & Lenschow, A. (2010). Environmental policy integration: a state of the art review. *Environmental Policy and Governance*, 20(3), 147-158. doi:10.1002/eet.539
- Kay, A. (2005). A Critique of the Use of Path Dependency in Policy Studies. *Public Administration*, 83(3), 553-571. doi:10.1111/j.0033-3298.2005.00462.x
- Keleman, A., Hellin, J., & Bellon, M. R. (2009). Maize diversity, rural development policy, and farmers' practices: lessons from Chiapas, Mexico. *The Geographical Journal*, 175(1), 52-70. doi:10.1111/j.1475-4959.2008.00314.x
- Kirwan, J., Ilbery, B., Maye, D., & Carey, J. (2013). Grassroots social innovations and food localisation: An investigation of the Local Food programme in England. *Global Environmental Change*, 23(5), 830-837. doi:<https://doi.org/10.1016/j.gloenvcha.2012.12.004>
- Kooiman, J., Bavinck, M., Chuenpagdee, R., Mahon, R., & Pullin, R. (2008). Interactive governance and governability: an introduction. *The Journal of Transdisciplinary Environmental Studies*, 7(1), 1-11.
- Kooiman, J., & Jentoft, S. (2009). Meta-Governance: values, norms and principles, and the making of hard choices. *Public Administration*, 87(4), 818-836. doi:10.1111/j.1467-9299.2009.01780.x
- Kuokkanen, A., Mikkilä, M., Kuisma, M., Kahiluoto, H., & Linnanen, L. (2017). The need for policy to address the food system lock-in: A case study of the Finnish context. *Journal of Cleaner Production*, 140, 933-944. doi:<https://doi.org/10.1016/j.jclepro.2016.06.171>

- Lang, T. (2009). Reshaping the Food System for Ecological Public Health. [Journal of Hunger & Environmental Nutrition]. *Journal of Hunger & Environmental Nutrition*, 4(3-4), 315-335. doi:10.1080/19320240903321227
- Leach, M., Nisbett, N., Cabral, L., Harris, J., Hossain, N., & Thompson, J. (2020). Food politics and development. *World Development*, 134, 105024. doi:<https://doi.org/10.1016/j.worlddev.2020.105024>
- Lenschow, A., Newig, J., & Challies, E. (2016). Globalization's limits to the environmental state? Integrating telecoupling into global environmental governance. *Environmental Politics*, 25(1), 136-159. doi:10.1080/09644016.2015.1074384
- Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability Transitions Research: Transforming Science and Practice for Societal Change. *Annual Review of Environment and Resources*, 42(1), 599-626. doi:10.1146/annurev-environ-102014-021340
- MacDonald, G. K., Brauman, K. A., Sun, S., Carlson, K. M., Cassidy, E. S., Gerber, J. S., & West, P. C. (2015). Rethinking Agricultural Trade Relationships in an Era of Globalization. *BioScience*, 65(3), 275-289. doi: <https://doi.org/10.1093/biosci/biu225>
- Malhi, L., Karanfil, Ö., Merth, T., Acheson, M., Palmer, A., & Finegood, D. T. (2009). Places to Intervene to Make Complex Food Systems More Healthy, Green, Fair, and Affordable. *Journal of Hunger & Environmental Nutrition*, 4(3-4), 466-476. doi:10.1080/19320240903346448
- Margulis, M. E., McKeon, N., & Borras, S. M. (2013). Land Grabbing and Global Governance: Critical Perspectives. *Globalizations*, 10(1), 1-23. doi:10.1080/14747731.2013.764151
- Massoud, M. A., Fayad, R., El-Fadel, M., & Kamleh, R. (2010). Drivers, barriers and incentives to implementing environmental management systems in the food industry: A case of Lebanon. *Journal of Cleaner Production*, 18(3), 200-209. doi:<https://doi.org/10.1016/j.jclepro.2009.09.022>
- Mayer, C. (1990). Financial systems, corporate finance, and economic development. In N. B. o. E. Research (Ed.), *Asymmetric information, corporate finance, and investment* (pp. 307-332). Chicago: University of Chicago Press.
- Mayer, F. W., & Phillips, N. (2017). Outsourcing governance: states and the politics of a 'global value chain world'. *New Political Economy*, 22(2), 134-152. doi:10.1080/13563467.2016.1273341
- Meadowcroft, J. (2007). Who is in Charge here? Governance for Sustainable Development in a Complex World*. *Journal of Environmental Policy & Planning*, 9(3-4), 299-314. doi:10.1080/15239080701631544

- Meadows, D. (1999). *Leverage Points: Places to Intervene in a System*. Retrieved from Hartland:
- Micheletti, M., Stolle, D., & Follesdal, A. (Eds.). (2003). *Politics, Products, and Markets: Exploring Political Consumerism Past and Present*. Somerset: Transaction Publishers.
- Middlemiss, L. (2018). *Sustainable Consumption. Key Issues*. Abingdon and New York: Routledge.
- Mol, A. P. J. (2010). Social Theories of Environmental Reform: Towards a Third Generation. In M. Gross & H. Heinrichs (Eds.), *Environmental Sociology: European Perspectives and Interdisciplinary Challenges* (pp. 19-38). Dordrecht: Springer.
- Neufeldt, H., Jahn, M., Campbell, B. M., Beddington, J. R., DeClerck, F., De Pinto, A., . . . Zougmore, R. (2013). Beyond climate-smart agriculture: toward safe operating spaces for global food systems. *Agriculture & Food Security*, 2(1), 12. doi:10.1186/2048-7010-2-12
- Newig, J., Challies, E., Cotta, B., Lenschow, A., & Schilling-Vacaflor, A. (2020). Governing global telecoupling toward environmental sustainability. *Ecology and Society*, 25(4). doi:10.5751/ES-11844-250421
- Nguyen, H., Morrison, J., & Neven, D. (2019). Changing Food Systems: Implications for Food Security and Nutrition. In C. Campanhola & S. Pandey (Eds.), *Sustainable Food and Agriculture* (pp. 153-168). London: Elsevier.
- Oosterveer, P. (2007). *Global Governance of Food Production and Consumption. Issues and Challenges*. Cheltenham: Edward Elgar Publishing.
- Oosterveer, P. (2015). Authority and legitimacy in governing global food chains. In T. Havinga, F. v. Waarden, & D. Casey (Eds.), *The Changing Landscape of Food Governance. Public and Private Encounters* (pp. 117-133). Cheltenham, UK • Northampton, MA, USA: Edward Elgar.
- Oosterveer, P., & Sonnenfeld, D. A. (2012). *Food, Globalization and Sustainability*. London and New York: Earthscan.
- Ostrom, E. (2009). A General Framework for Analyzing Sustainability of Social-Ecological Systems. *Science*, 325(5939), 419-422. doi:10.1126/science.1172133
- Papargyropoulou, E., Lozano, R., K. Steinberger, J., Wright, N., & Ujang, Z. b. (2014). The food waste hierarchy as a framework for the management of food surplus and food waste. *Journal of Cleaner Production*, 76, 106-115. doi:<https://doi.org/10.1016/j.jclepro.2014.04.020>
- Parker, C., & Johnson, H. (2019). From Food Chains to Food Webs: Regulating Capitalist Production and Consumption in the Food System. *Annual Review of Law and Social Science*, 15(1), 205-225. doi:10.1146/annurev-lawsocsci-101518-042908

- Parsons, K., & Hawkes, C. (2018). *Connecting food systems for co-benefits: How can food systems combine diet-related health with environmental and economic policy goals?* Retrieved from Copenhagen:
- Pereira, L. M., Drimie, S., Maciejewski, K., Tonissen, P. B., & Biggs, R. O. (2020). Food System Transformation: Integrating a Political–Economy and Social–Ecological Approach to Regime Shifts. *International Journal of Environmental Research and Public Health*, 17(4), 1313.
- Piattoni, S. (2009). Multi-level Governance: a Historical and Conceptual Analysis. *Journal of European Integration*, 31(2), 163-180. doi:10.1080/07036330802642755
- Pitt, H., & Jones, M. (2016). Scaling up and out as a Pathway for Food System Transitions. *Sustainability*, 8(10), 1025. Retrieved from <https://www.mdpi.com/2071-1050/8/10/1025>
- Porkka, M., Kummu, M., Siebert, S., & Varis, O. (2013). From Food Insufficiency towards Trade Dependency: A Historical Analysis of Global Food Availability. *PLoS ONE*, 8(12), e82714. Retrieved from <http://dx.doi.org/10.1371%2Fjournal.pone.0082714>
- Provan, K. G., & Kenis, P. (2008). Modes of Network Governance: Structure, Management, and Effectiveness. *Journal of Public Administration Research and Theory*, 18(2), 229-252. doi:10.1093/jopart/mum015
- Provan, K. G., Kenis, P., & Human, S. E. (2008). Legitimacy building in organizational networks. In L. B. Bingham & R. O’Leary (Eds.), *Big ideas in collaborative public management* (pp. 121-137). New York: M. E. Sharpe.
- Rapoport, A. (1986). *General System Theory. Essential Concepts & Applications*. Turnbridge Wells: Abacus Press.
- Reardon, T., & Hopkins, R. (2006). The Supermarket Revolution in Developing Countries: Policies to Address Emerging Tensions Among Supermarkets, Suppliers and Traditional Retailers. *The European journal of development research*, 18(4), 522-545.
- Renting, H., Schermer, M., & Rossi, A. (2012). Building Food Democracy: Exploring Civic Food Networks and Newly Emerging Forms of Food Citizenship. *International Journal of Sociology of Agriculture and Food*, 19(3), 289-307. Retrieved from <http://ijsaf.org/contents/19-3/renting/index.html>
- Rip, A. (2006). A co-evolutionary approach to reflexive governance - and its ironies. In J.-P. Voss, Direk Bauknecht and René Kemp (Ed.), *Reflexive Governance for Sustainable Development* (pp. 82-100). Cheltenham and Northampton: Edward Elgar.
- Risse, T. (Ed.) (2011). *Governance without a state? Policies and politics in areas of limited statehood*. New York: Colombia University Press.

- Rockström, J., Edenhofer, O., Gaertner, J., & DeClerck, F. (2020). Planet-proofing the global food system. *Nature Food*, 1(1), 3-5. doi:10.1038/s43016-019-0010-4
- Rotmans, J., & Loorbach, D. (2009). Complexity and Transition Management. *Journal of industrial ecology*, 13(2), 184-196. doi:10.1111/j.1530-9290.2009.00116.x
- Ruben, R., Verhagen, J., & Plaisier, C. (2018). The challenge of food systems research: What difference does it make? *Towards Sustainable Global Food Systems*, 1.
- Sahota, A. (2009). The global market for organic food & drink. *The world of organic agriculture. Statistics and emerging trends, 2009*, 59-64.
- Schilpzand, R., Liverman, D., Tecklin, D., Gordon, R., Pereira, L., Saxl, M., & Wiebe, K. (2010). Governance Beyond the State: Non-State Actors and Food Systems. In J. Ingram, P. Ericksen, & D. Liverman (Eds.), *Food Security and Global Environmental Change* (pp. 272-300). London and Washington DC: Earthscan.
- Scoones, I. (2009). The politics of global assessments: the case of the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD). *The Journal of Peasant Studies*, 36(3), 547-571. doi:10.1080/03066150903155008
- Scoones, I., Stirling, A., Abrol, D., Atela, J., Charli-Joseph, L., Eakin, H., . . . Yang, L. (2020). Transformations to sustainability: combining structural, systemic and enabling approaches. *Current Opinion in Environmental Sustainability*, 42, 65-75. doi:<https://doi.org/10.1016/j.cosust.2019.12.004>
- Smith, P., House, J. I., Bustamante, M., Sobocká, J., Harper, R., Pan, G., . . . Pugh, T. A. M. (2016). Global change pressures on soils from land use and management. *Global Change Biology*, 22(3), 1008-1028. doi:10.1111/gcb.13068
- Spaargaren, G., Oosterveer, P., & Loeber, A. (Eds.). (2012). *Food Practices in Transition. Changing Food Consumption, Retail and Production in the Age of Reflexive Modernity*. New York and London: Routledge.
- Springmann, M., Clark, M., Mason-D'Croz, D., Wiebe, K., Bodirsky, B. L., Lassaletta, L., . . . Willett, W. (2018). Options for keeping the food system within environmental limits. *Nature*, 562(7728), 519-525. doi:10.1038/s41586-018-0594-0
- Stoker, G. (1998). Governance as theory: five propositions. *International Social Science Journal*, 50(155), 17-28.
- Swinburn, B. (2019). Power Dynamics in 21st-Century Food Systems. *Nutrients*, 11(10), 2544.
- Swinburn, B., Kraak, V. I., Allender, S., Atkins, V. J., Baker, P. I., Bogard, J. R., . . . Dietz, W. H. (2019). The Global Syndemic of Obesity, Undernutrition, and Climate Change: The

- Lancet Commission report. *The Lancet*, 393(10173), 791-846. doi:10.1016/s0140-6736(18)32822-8
- Termeer, C. J. A. M., Dewulf, A., & Biesbroek, G. R. (2017). Transformational change: governance interventions for climate change adaptation from a continuous change perspective. *Journal of Environmental Planning and Management*, 60(4), 558-576. doi:10.1080/09640568.2016.1168288
- Termeer, C. J. A. M., Dewulf, A., Breeman, G., & Stiller, S. J. (2015). Governance Capabilities for Dealing Wisely With Wicked Problems. *Administration & Society*, 47(6), 680-710. doi:10.1177/0095399712469195
- Termeer, C. J. A. M., Drimie, S., Ingram, J., Pereira, L., & Whittingham, M. J. (2018). A diagnostic framework for food system governance arrangements: The case of South Africa. *NJAS - Wageningen Journal of Life Sciences*, 84, 85-93. doi:<https://doi.org/10.1016/j.njas.2017.08.001>
- Thompson, J., & Scoones, I. (2009). Addressing the dynamics of agri-food systems: an emerging agenda for social science research. [Special Issue: Food Security and Environmental Change Food Security and Environmental Change: Linking Science, Development and Policy for Adaptation]. *Environmental Science & Policy*, 12(4), 386-397. doi:<http://dx.doi.org/10.1016/j.envsci.2009.03.001>
- van Bers, C., Delaney, A., Eakin, H., Cramer, L., Purdon, M., Oberlack, C., . . . Vasileiou, I. (2019). Advancing the research agenda on food systems governance and transformation. *Current Opinion in Environmental Sustainability*, 39, 94-102. doi:<https://doi.org/10.1016/j.cosust.2019.08.003>
- van Bers, C., Pahl-Wostl, C., Eakin, H., Ericksen, P., Lenaerts, L., Förch, W., . . . Eriksen, S. (2016). *Transformations in governance towards resilient food system*. Retrieved from Copenhagen, Denmark: www.ccafs.cgiar.org
- WCED, T. W. C. o. E. a. D. (1987). *Our Common Future*. Oxford and New York: Oxford University Press.
- Weber, H., Poeggel, K., Eakin, H., Fischer, D., Lang, D. J., Wehrden, H. V., & Wiek, A. (2020). What are the ingredients for food systems change towards sustainability?—Insights from the literature. *Environmental Research Letters*, 15(11), 113001. doi:10.1088/1748-9326/ab99fd
- Wilkinson, G., & Dale, B. G. (1999). Integrated management systems: an examination of the concept and theory. *The TQM Magazine*, 11(2), 95-104. doi:10.1108/09544789910257280
- Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., . . . Murray, C. J. L. (2019). Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from

sustainable food systems. *The Lancet*, 393(10170), 447-492. doi:10.1016/s0140-6736(18)31788-4

Yeoman, R., & Santos, M. M. (2019). Global value chains, reputation, and social cooperation. In D. L. Deephouse, N. A. Gardberg, & W. Newburry (Eds.), *Global Aspects of Reputation and Strategic Management* (pp. 69-91). Boston: Emerald Publishing Limited.