Transformation in governance towards resilient food systems

Working Paper No. 190

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

Caroline van Bers, Claudia Pahl-Wostl, Hallie Eakin, Polly Ericksen, Lutgart Lenaerts, Wiebke Förch, Kaisa Korhonen-Kurki, Nadine Methner, Lindsey Jones, Ioannis Vasileiou, Siri Eriksen

CGIAR

RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security

CCAFS

Working Paper

Transformation in governance towards resilient food systems

Working Paper No. 190

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

Caroline van Bers, Claudia Pahl-Wostl, Hallie Eakin, Polly Ericksen, Lutgart Lenaerts, Wiebke Förch, Kaisa Korhonen-Kurki, Nadine Methner, Lindsey Jones, Ioannis Vasileiou, Siri Eriksen

Correct citation:
van Bers C, Pahl-Wostl C, Eakin H, Ericksen P, Lenaerts L, Förch W, Korhonen-Kurki K, Methner N, Jones L, Vasileiou I, Eriksen S. 2016. Transformations in governance towards resilient food systems. CCAFS Working Paper no. 190. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

Titles in this Working Paper series aim to disseminate interim climate change, agriculture and food security research and practices and stimulate feedback from the scientific community.

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a strategic partnership of CGIAR and Future Earth, led by the International Center for Tropical Agriculture (CIAT). The Program is carried out with funding by CGIAR Fund Donors, Australia (ACIAR), Ireland (Irish Aid), Netherlands (Ministry of Foreign Affairs), New Zealand Ministry of Foreign Affairs & Trade; Switzerland (SDC); Thailand; The UK Government (UK Aid); USA (USAID); The European Union (EU); and with technical support from The International Fund for Agricultural Development (IFAD).

Contact:
CCAFS Coordinating Unit - Faculty of Science, Department of Plant and Environmental Sciences, University of Copenhagen, Rolighedsvej 21, DK-1958 Frederiksberg C, Denmark. Tel: +45 35331046; Email: ccafs@cgiar.org

Abstract

The dynamics of systemic societal transformations are not well understood, and the extent to which such transformations can be governed is contested. This research paper is the result of a joint effort among a small group of researchers to identify pathways for transformation towards sustainable food systems, which are resilient towards shocks and towards climate change in particular. Using empirical studies, both transformations in governance systems and governance of transformations were investigated. These cases served as a preliminary analysis to identify some of the trends and patterns that warrant further investigation. Not surprisingly, transformational change in food systems is often triggered by a shock to the system, or by increasing pressure to that system. But that alone is not enough to bring about a transformation. A number of preconditions and conditions need to be present including sufficient 'wealth' or economic and social capital in the system with resources that can be mobilized, and sufficient flexibility in the institutional context to allow innovation to emerge and gain strength. A particular area of interest that appears to stimulate transformations is collective action, which often involves collaboration across geographical scales and interest groups. The outcomes of transformations are complex and typically multifaceted, and can take years to emerge. However, broadly speaking, the cases explored demonstrate that governance is central to food system transformation both in terms of pre-conditions and provoking processes as well as in the outcomes of the transformation itself. Food system transformations in general appear to entail fundamental shifts in social relations and institutions – in other words, the governance of the food system.

Keywords

Transformations; Governance; Food systems; Food Security; Resilience.

About the authors

Hallie Eakin, School of Sustainability, Arizona State University, United States

Polly Ericksen, International Livestock Research Institute, Kenya

Siri Eriksen, International Environment and Development Studies, Norwegian University of Life Sciences, Norway

Wiebke Förch, Gesellschaft fuer Internationale Zusammenarbeit (GIZ), Botswana

Lindsey Jones, London School of Economics, United Kingdom

Kaisa Korhonen-Kurki, Tutkimustyö Centre for International Forestry Research, Finland

Lutgart Lenaerts, International Environment and Development Studies, Norwegian University of Life Sciences, Norway

Nadine Methner, Environmental Sciences, University of Cape Town, South Africa

Claudia Pahl-Wostl, Institute of Environmental Systems Research, Osnabrück University, Germany

Caroline van Bers, Institute of Environmental Systems Research, Osnabrück University, Germany

Ioannis Vasileiou, CGIAR and World Bank, United States

Acknowledgements

We would like to thank Katrien Termeer and Jeroen Candel for their valuable insights during our workshop in Wageningen. Our thanks also go to all of the authors who provided input and responded to requests for feedback during the review.

Contents

1. Introduction

1.1 Background of this study

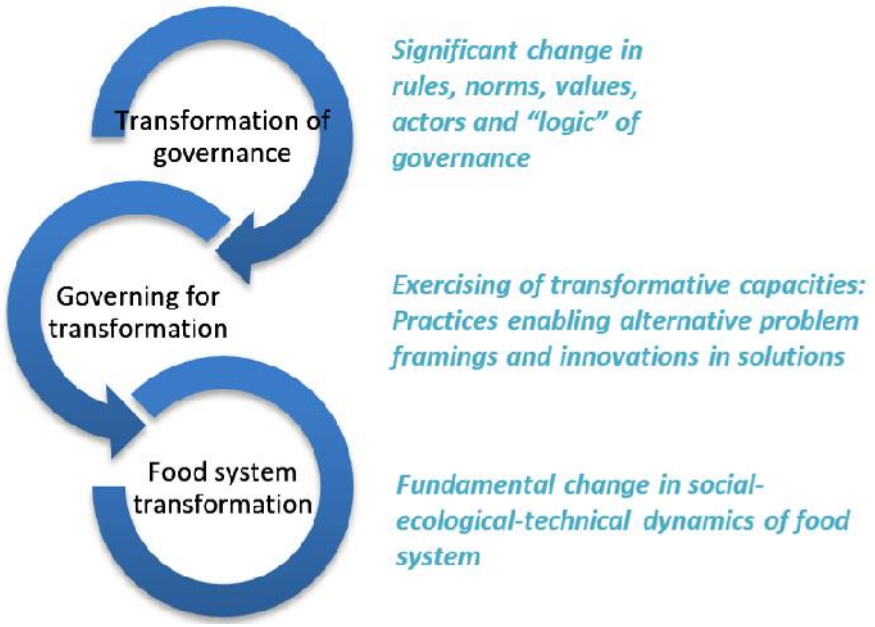
Adaptation to climate change in food systems to date has largely been framed as a technological and economic challenge; nevertheless, the wealth of research on food security, food sovereignty and historical transformations in food and agricultural systems suggests that governance plays critical roles in reproducing vulnerabilities, influencing capacities and structuring pathways of change. Given the central importance of food and agricultural systems to society, stability and maintaining the status quo is often the goal of existing governance arrangements. Yet the current unprecedented rate of social-environmental change (e.g., land use change, declining agricultural productivity and climate-induced famine) threatens to overwhelm current governance arrangements and institutions; new arrangements are required to meet evolving food security, environmental integrity and social justice objectives. Transformative change in food system governance may well be required.

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) held a meeting in Brussels in 2015 of 40 participants from diverse research institutions and international organisations around the world with extensive expertise over a wide range of relevant themes including, among others, governance of natural resources, economic globalization, global environmental change and vulnerability and adaptation to climate change. Themes discussed in group work at the meeting included: linkages and cross-scale issues, non-traditional actors, transformation, discourses (for climate smart agriculture), and indicators. These were subsequently partially merged into two working groups: effective indicators and transformations of food systems. The indicators working group led by Tom Evans, Indiana University, has undertaken a meta-analysis of empirical data focusing on governance of food systems and food security. The results are presented in a CCAFS working paper, Delaney et al. (2016), available from www.ccafs.cgiar.org.

The Transformations Working Group of CCAFS has carried out a scoping study on "Transformation in governance towards resilient food systems". The working group reflects the joint interest of its members in the transformation of governance systems and the governance of transformation. Transformation of governance systems is a critical aspect of the transformation of food systems. Transformation signifies "a change in the fundamental

attributes of natural and human systems" (IPCC 2014, p. 1774 (glossary)). Transformation implies fundamental changes in not only practices, but also values and governance systems (IPCC, 2014). According to O'Brien et al. (2014), transformation in practice, such as food systems, is driven by transformation in the political sphere, which includes the systems that create the rules, norms, and incentives for different types of behaviours and practices. These in turn are influenced by transformation in the personal sphere; that is, shared beliefs, values and worldviews often drive political priorities and goals and influence framings of problems and solutions. Hence, governance not only needs to facilitate transformation but also some characteristics of governance itself also need to be transformed in order to facilitate transformation in food systems (see Figure 1).

Figure 1: Food system transformation through transformations in governance



Source: Hallie Eakin

Research on sustainability transformations identifies spaces for transformation being opened up through tension between environmental governance and practice, as well as through untenable social and environmental conditions acting as pressures on an existing political regime (Pelling, 2011). Recent research also focuses on the potential of champions of change, people who promote new ways of thinking and acting, to initiate transformative large-scale collective action (Straith et al., 2014). Nevertheless, the conditions under which, and the relations through which transformative change takes place is poorly understood.

The working group has focused on why and how governance systems transform, and the potential pathways for transformations (in governance) towards sustainable food systems. A distinction is made in the nature of transformations needed in the Global South where climate resilience and food security play the most significant role, and in the Global North, where food supply is for the most part adequate but the system is unsustainable from production to consumption.

This scoping paper is the outcome of the work carried out by the CCAFS Transformations Working Group. It forms the basis of a journal article and of a follow-up project. The results summarized in this report have also been presented in a dialogue session organised by the working group at the International Sustainability Transformations Conference in Wuppertal 07-09 September 2016 (see Appendix 1).

1.2 Purpose and organization of this study

The Transformations Working Group was interested in investigating:

1. how transformations in food system governance occur and what can be learned to support efforts to intentionally transform governance arrangements;
2. what components of the food system are associated with the drivers and outcomes of transformation; and
3. how changes in contextual factors relate to changes in food system governance, rather than just in the food system itself.

This scoping paper presents the results of the investigation which attempted to address these questions, with the intention of providing preliminary evidence and avenues for further research.

In this paper, we first define concepts key to our understanding of how transformation, governance and food systems are related. In section 2, the approach and method used in the literature review are presented, including how the literature was selected, and how the review was undertaken including coding and synthesis of findings. In section 3 we present the results of this synthesis. A summary of our findings and recommendations for questions guiding a subsequent and more comprehensive study are provided in section 4.

1.3 General definitions

We begin with the premise that a transformation in governance of food systems, albeit incremental, is essential to achieve a transformation in food systems. The characteristics of the governance of food systems and the nature of the outcomes of the food systems (e.g. food security, welfare, environmental sustainability) are related, and it is possible to discern a general pattern of these types of relationships which are context-sensitive but not context specific. Several definitions as understood by the working group for the purposes of this review are presented below.

Governance: The governance of food systems refers to processes and actor constellations that shape decision-making and activities related to the production, distribution and consumption of food. We concur that "[g]overnance is more than the formal functions of government but also includes markets, traditions and networks, and non-state actors such as firms and civil society" (Liverman and Kapadia, 2010, p. 20).

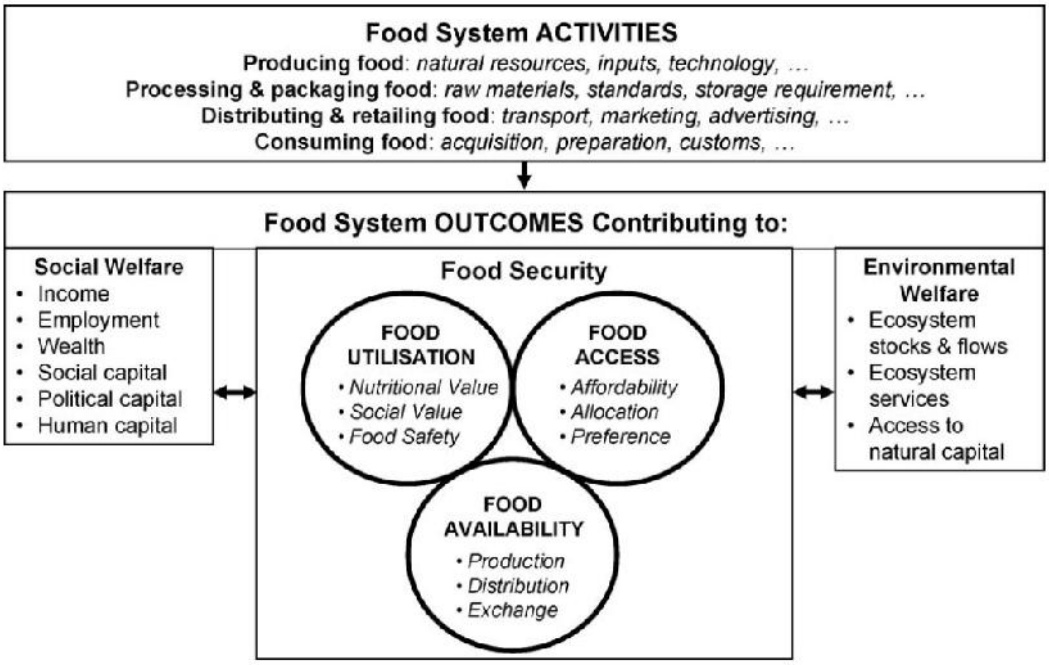
Transformation: A transformation in a governance system can be defined as structural change in several interdependent system components (e.g., institutions, configuration of actor networks) and change in the overall logic of the system, i.e., in dominant cultural cognitive institutions. Transformative capacity refers then to the ability of a governance system to first adapt and if required transform structural elements in response to experienced or expected changes in the societal or natural environment. The process towards transformation may be fluid though, and there may be considerable overlap with incremental adaptations that may constitute a first step towards transformation. Furthermore, operationalizing transformative change is challenging. It is not easy to identify transformative changes that are in process; often it is only in hindsight relative to a baseline condition that a change is acknowledged as truly transformative.

Food Security Governance: The formal and informal interactions across scales between public and/or private entities ultimately aiming at the realization of food availability, food access, and food utilization, and their stability over time. (Candel, 2014, p. 598)

Food systems are the "activities and outcomes ranging from production through to consumption, which involve both human and environmental dimensions" (Ericksen, 2008, para. 10), for the purpose of achieving food security, defined as when "all people, at all times,

have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (World Food Summit, 1996). As highlighted in Figure 2 the outcomes of food systems need to be evaluated by their contributions to both societal (economic and social) and environmental welfare.

Figure 2. The GECAFS food system concept



Source: Ericksen et al, 2009.

2. Approach and method

In this section, we describe our approach, the themes and search criteria used, and coding system developed for the literature review. It should be stressed that we undertook a scoping study. Hence, the number of articles and book chapters selected for review cannot be considered comprehensive. The study serves as a foundation for a larger study of the literature.

2.1 Guiding questions

The project relied on expert input, including working group members and others consulted and a literature review of transformation in food systems and selected concepts of transformative change addressing the following questions:

1. What triggered the transformation?
2. What were the factors/(pre)conditions that influenced this change?
3. In which components of the food system did the transformation occur?
4. What was transformed?

These questions formed the starting point for a more detailed coding scheme outlined in the next section. While we have focused on the factors that facilitate a transformation (Question 2), the study also examined those factors that may hinder or prevent a transformation. To address all of these questions, we focused on well-known cases in which food system transformations of some nature have been documented, and systematically coded these cases in relation to the four questions listed above.

2.2 Themes and criteria for selection of literature

The emphasis of the review was on literature examining or providing empirical evidence rather than literature with a conceptual focus, although several conceptual articles also supported the analysis (e.g., Westley et al., 2011; Biermann et al., 2014; Hospes and Brons, 2016). Regarding the overall thematic areas the group identified global trends that were judged to constitute a transformation in food systems or to be transformative in scope and/or stated ambition. The group focused on cases touching two thematic areas of transformation: those that involving primarily technological change (Green Revolution, sustainable

agriculture); and those encompassing primarily institutional change (Fair Trade, social protection, food sovereignty, power structures).

The literature selected for review (34 articles and chapters) include primarily empirical studies published in journal articles, book chapters and reports of international governmental and non-governmental organisations. The following criteria further guided the selection of publications for review including that the process and/or outcomes:

- have been transformative (at any scale) or are sufficiently advanced in the transformative process;
- are sustainable or unsustainable;
- have taken place in the past 20 to 30 years;
- have sufficient data;
- cover one or more elements in the production - distribution - consumption chain; and
- focus on the Global South and North at all levels of scale.

It was not necessary for each of these criteria to be fulfilled but at least half of them were in each instance.

2.3 Coding scheme

The working group developed a coding system (Table 1) on the basis of an initial review of the literature identified as well as their own knowledge of the theoretical literature on governance and transformation (e.g., Brown, et al., 2013; Olsson et al., 2006; Hospes and Brons, 2016).

Table 1. The elements and description of the coding scheme for the literature review

Elements	Description
1. What were the **EVENTS** or **DRIVERS** (or combinations thereof) that triggered the transformation in the food systems and/or in the governance of food systems?	These triggers include crisis (economic, environmental etc.); geopolitical moments; leadership; exploitation of institutional gap by institutional entrepreneurs; advocacy coalitions; exploitation of symbolic value of environmental or social phenomena (e.g., monarch butterfly, food ethics); need/desire for access to resources; economic incentives and opportunities; new paradigms: related to access to new knowledge and ideas, cultural cognitive institutions; new values/societal norms (especially in food); change in regulatory mechanisms (e.g., EU CAP, IPCC, anti-GMO legislation); and technological change.

Elements	Description
2. What were the **PRECONDITIONS** (contextual and often chronic) that facilitate or hinder a transformation in food systems and/or in the governance of food systems?	Presence or absence of institutional protection: ▪ Access to (financial, human, social (network), logistical) resources ▪ Effectiveness of formal institutions (e.g., corruption) ▪ Access to knowledge for different societal groups ▪ Lock-in to reigning paradigm
3. What were the **CONDITIONS** (or combinations thereof) associated with mechanisms that facilitated or hindered a transformation towards more sustainable food systems as measured by the outcomes of food systems?	Possible conditions: ▪ External sources of innovation, disruption of inertia ▪ Capacity for collective reflection (including critique) ▪ Communication infrastructure (e.g., IT, information nodes) ▪ Collective action ▪ Capacity for local and regional self-governance (with strong local leadership and embeddedness in larger democratic systems, e.g., transition towns) ▪ Presence of boundary organisations ▪ Polycentric governance: a distribution of power combined with coordination (which is to some extent hypothetical) ▪ Better mechanisms for sharing of risk
4. What were the transformations in **GOVERNANCE** of food systems?	**Institutions:** 'Institution' is used here according to the convention in institutional analyses within the social sciences, to denote rules governing the behaviour of actors. Institutions may be classified according to Scott (2001) who distinguishes between three pillars of institutions: regulative (what is formally allowed and what is not allowed), normative (what is right and what is wrong judged by societal standards), cultural-cognitive (what is thinkable and what is unthinkable - paradigms). **Actor networks - Power structures**: Refers to the kind of actors (state, non-state) involved in governance and their role, and to changes in network boundaries and connections. **Cooperation and coordination structures:** Governance modes refers to the nature and logic of coordination of actors which can be captured by governance modes - markets, bureaucratic hierarchies, networks. It could involve a shift in the dominant mode of governance or a shift towards more hybrid forms of governance. **Multi-level interaction:** Refers to the distribution of power and authority across levels and the degree of coordination across levels – vertical coordination. Changes might involve a shift towards more polycentric structures and balance between bottom-up and top-down approaches. **Cross-sectoral integration:** refers to horizontal coordination across sectoral boundaries, for example, by legal provisions and new planning instruments.
5. What were the transformations in food system **ACTIVITIES**?	▪ **Production** including processing and packaging food ▪ **Distribution** and retailing of food ▪ **Consumption** of food
6. What were the transformations in food system **OUTCOMES**?	▪ Food security ▪ Food utilization (nutritional value, social value, food safety) ▪ Food access (affordability, allocation, preference) ▪ Food availability (production, distribution, exchange) ▪ Resilience, in particular to climate change ▪ Social welfare (income, employment, wealth, social capital, political capital, human capital) ▪ Environmental sustainability including preservation of natural capital

2.4 Limitations of our approach

As a scoping study the purpose was to examine relevant samples of literature on various food system subjects that involve or have the potential to lead to transformations. It was not intended as a comprehensive review but rather to provide **indications** of the links between governance and transformations in the food system and **to suggest directions for further research**. There were several limitations to the approach used in this study. These limitations are described here briefly.

We were dependent on what the authors chose to report or focus on in their account of food system change. We did not attempt to triangulate, for example by reviewing a representative sample of reports of a particular 'transformation'. Rather we relied on up to three or four examinations (e.g., articles produced by different authors) of a particular change.

In reviewing the literature several of the elements (1st column) listed in Table 1 have characteristics or aspects (2nd column) that do not clearly fall into one category of the coding system. In particular, the line between *food availability* and *access to food* in the food system outcomes is blurred. Moreover, food security encompasses both of these.

There were several articles of a more general nature on food systems governance, global environmental change and social transformation that could not be coded or only partially because of their more conceptual nature and focus on generalizing from empirical studies. However, as mentioned at the outset of section 2, these sources have been used to inform our analysis.

3. Summary of the literature review

In this section, the results of the literature review and, in particular, the coded review are summarized. First, the coding results are provided according to the factors influencing the transformation from triggers to outcomes. This is followed by a discussion of these results from details drawn from the literature reviewed.

3.1 Cumulative coding results

The questions used to review and code the selected literature that are listed in section 2 on methods are referred to henceforth as: **triggers, preconditions, conditions, transformation of governance, transformation of activities, and outcomes.** As outlined in the methods section, the coded review involved literature from a number of realms within which transformations have taken place and roughly grouped according to those stemming from or relying primarily on technological change and those involving mainly institutional change:

- **Technological change:** Green Revolution, sustainable agriculture
- **Institutional change:** Fair Trade, social protection, land grabbing, food sovereignty, and structures of power.

Clearly, the factors that play a role in either influencing the transformation or are influenced by the transformation will vary among these realms (e.g., in our study food-related crises played a significant role in the emergence of the food sovereignty movement, whereas new paradigms stimulated the social protection agenda). Nonetheless, the codes were tallied for each question to identify those factors that have played a dominant role in transformations of food system governance and/or food system activities whether these be perceived as changes that positively or negatively influence the sustainability of the food system. Table 2 presents the tally of the coding by factor for each of the questions addressed, and as a proportion of the total number of articles reviewed. Based on those outcomes and the descriptive explanations accompanying them, we provide in this section a summary and where possible an explanation of the identified factors/elements that have played the most significant role (e.g., triggers) in a transformation, those that played little or no role and where applicable, findings that surprised us.

Table 2. Results of coded literature review: Factors influencing transformations

Questions addressed and factors that could explain (proportionately higher number of instances associated with specific factors are in **bold**)	**Sum of codes**	**% of total**
Total number of articles/chapters/reports reviewed and coded	**34**	**100.0%**
1. What were EVENTS or DRIVERS (or combinations thereof) that triggered the transformation in the food systems and/or in the governance of food systems?		
Crisis (economic, environmental etc.)	**20**	**58.8%**
Geopolitical moments	4	11.8%
Leadership (emergent, governmental….)	4	11.8%
Exploitation of institutional gap by institutional entrepreneurs	2	5.9%
Advocacy coalitions	6	17.6%
Exploitation of symbolic value of environmental or social phenomena (e.g., monarch butterfly, food ethics)	0	0.0%
Need/desire for access to resources	5	14.7%
Economic incentives and opportunities	4	11.8%
New paradigms: related to access to new knowledge and ideas, cultural cognitive institutions	4	11.8%
New values/societal norms (esp. in food)	8	23.5%
Change in regulatory mechanisms (e.g., EU CAP, IPCC, anti-GMO legislation)	2	5.9%
Technological Change	4	11.8%
2. PRECONDITIONS (contextual and often chronic) that facilitate or hinder a transformation in food systems and/or in the governance of food systems		
Presence or absence of institutional protection (e.g. customary rights)	9	26.5%
Access to (financial, human, social (network), logistical) resources	**12**	**35.3%**
Effectiveness of formal institutions (e.g. corruption)	**10**	**29.4%**
Access to knowledge for different societal groups	5	14.7%
Lock-in to reigning paradigm	**10**	**29.4%**
3. CONDITIONS (combinations thereof) associated with mechanisms that facilitate or hinder a transformation towards more sustainable food systems as measured by the outcomes of food systems		
External sources of innovation, disruption of inertia	9	26.5%
Capacity for collective reflection…(including reflection, critique…)	8	23.5%
Communication infrastructure (IT, information nodes….)	7	20.6%
Collective action	**10**	**50.0%**
Capacity for local and regional self-governance (with strong local leadership and embeddedness in larger democratic systems, e.g., transition towns)	8	23.5%
Presence of boundary organisations	3	8.8%
Polycentric governance - a distribution of power combined with coordination (to some extent hypothetical)	6	17.6%
Better mechanisms for sharing of risk (hypothetical)	5	14.7%
4. What were the transformations in GOVERNANCE of food systems?		
Institutions	**17**	**50.0%**
Actor networks – Power structures	**20**	**58.8%**
Cooperation and coordination structures	**21**	**61.8%**
Multi-level interaction	**10**	29.4%
Cross-sectoral integration	**9**	26.5%
5. What were the transformations in food system ACTIVITIES?		
Production including processing and packaging food	**26**	**76.5%**
Distribution and retailing of food	**15**	44.1%
Consumption of food	**13**	38.2%
6. What was the transformation in food system OUTCOMES?		
Food Security	**7**	20.6%
Food utilization (Nutritional value, social value, food safety)	**2**	5.9%
Food access (Affordability, allocation, preference)	**9**	26.5%
Food availability (Production, distribution, exchange)	**11**	**32.4%**
Resilience, in particular to climate change	**4**	11.8%
Social Welfare (income, employment, wealth, social capital, political capital, human capital)	**17**	**50.0%**
Environmental Sustainability including preservation of natural capital	**12**	**35.3%**

Highest tallies highlighted in yellow.

3.2 Evidence of factors influencing transformations

3.2.1 Events as triggers for transformations

Triggers are defined as those events or drivers (and, in some cases, combinations of these) that triggered the transformation in the governance of a food system or directly in a food system at any scale from local to global. They reflect what researchers already know and look for, as well as their problem understanding.

Lester Brown (2009) identifies three models of social change which can be seen as triggers:

1) the catastrophic event model also referred to as the *Pearl Harbor model*, "where a dramatic event fundamentally changes how we think and behave".

2) The tipping point often reached by a society "after an extended period of gradual change in thinking and attitudes. This I call the *Berlin Wall model*.

3) *The sandwich model* "where there is a strong grassroots movement pushing for change on a particular issue that is fully supported by strong political leadership at the top".

(Brown, 2009, p. 256)

Regarding food systems, the Pearl Harbor model would imply that a fundamental shift occurs only after a catastrophic event that may expose fundamental flaws in the prevailing system logic. The problem with the Pearl Harbor model is that by the time that the crisis occurs it may be too late to implement a change to avoid breakdown and long-term undesirable consequences especially when systems are irreversibly altered. In the Berlin Wall model, change often happens rapidly and without direction once a tipping point is reached as it did when Eastern Europe rejected communism in the late 1980s. However, it required some 40 years before this tipping point occurred. Similarly, with the anti-smoking movement that began in the 1960s with a medical report on the effects of smoking, it took decades, Brown (2009) reminds us that, until the medical information against smoking outweighed the counter campaigns of the tobacco industry. Since the transformation took place over a long time period it is not clear that a transformation has taken place until some threshold has been past. Nonetheless the factors that lead to a system shift can be fundamental to the process, although it is often only in retrospect that we know what those factors were. If such factors can be

identified early, there is a possibility of anticipating tipping points through monitoring the dynamics of such factors over time.

The sandwich model is potentially the most attractive regarding governance that contributes to a transformation in food systems because it allows for directed and rapid change combining grassroots and governmental action. The example that Brown provides is carbon reductions in response to climate change which is the result of agenda for transformation. Though the tipping point has not been reached, significant (though arguably insufficient) changes have been realised through technological and regulatory means. The triggers described by Brown (2009) are not "discrete events" that led to change but rather societal shifts that collectively trigger transformative changes.

In our analysis of the literature the most frequently occurring trigger is often a crisis, suggesting the Pearl Harbor model of change may be particularly salient in the documented cases of food system transformation. In almost 60% of the studies we reviewed, a crisis appeared to provide the impulse for (partial) transformations, although as suggested below, a geopolitical opportunity may emerge from a crisis and can be the real impetus behind a transformation. Beyond crisis events, the review we conducted did not identify any other triggers that were widely shared across the cases of transformations in food systems, although new values and norms appeared to have an influence in about one-quarter of the studies reviewed.

In the case of the Green Revolution (1940s-60s), most academic narratives suggest the technological innovations emerged from a narrative of crisis whether real or manufactured. The perceived or actual threat of famine, food insecurity, and population growth (and predictions thereof) provided a geopolitical moment that led to the mobilization of scientific resources, philanthropists and political actors in the United States to support agricultural intensification abroad. However, the desire to stimulate new international market opportunities, particularly in the Global South is now largely accepted as a significant motivation behind the Green Revolution (Smith, 2009; Cleaver, 1972). Many scholars argue that the Green Revolution has led to greater inter-farm and interregional inequality (Freebairn, 1995). Despite this intensification of food production, crises associated with local or regional food insecurity are still widespread, affected by climate change, environmental degradation, urbanisation and export of food from developing countries to more profitable markets abroad.

Together this has stimulated increasing social pressure and accompanying initiatives to sustainable management of the environment and agriculture.

3.2.2 Preconditions

Preconditions are those already prevailing contextual and often chronic conditions that facilitate or hinder a transformation in food systems and/or in the governance of food systems. In our review, three conditions appeared more often: **access to resources** (35% of the literature), **the effectiveness** (or, in some cases, lack) **of formal institutions** (29%), and **lock in to a reigning paradigm** (29%). Each is described in terms of more specific conditions identified in the empirical studies reviewed.

Access to resources

Access to sufficient social and economic resources appears to play a significant role in facilitating transformations in food systems and/or in food system governance. The most far-reaching example of the last half century is the Green Revolution, which was brought about huge investments by national governments and the Rockefeller Foundation in crop research and agricultural technology. More recently, access to resources (financial, human, social/network, logistical) contributed to transformations at the local level by facilitating food citizenship, food sovereignty and social inclusion (Sage, 2014), collective problem-solving (Clancy, 2014), and capacity building (Kirwan, 2013). An example of local-level transformations facilitated by financial and land resources is the Local Food programme of the Royal Society of Wildlife Trusts of England, which brought neglected land into production and affordable food onto the market through autonomous local projects (Kirwan et al., 2013). A similar set of programmes in the US examined by Kania and Kramer (2011) demonstrated that sufficient funding (in this case from diverse public and private sources) supports the coordination of organisations necessary to bring about change. In the case of organic agriculture and Fair Trade, the success of these movements invited corporate engagement. Nevertheless, while corporate engagement entailed an influx of financial resources into the Fair Trade supply chain, it also raised concerns about eventual co-optation as a result of economic incentives and corporate entities seeking opportunities for access to capital (Jaffee and Howard, 2009).

Effectiveness of formal institutions

Formal institutions are the rules within a legal system that are clearly defined in written documents and where compliance is monitored and sanctions are imposed by jurisdictions. These formal institutions can play a key role in facilitating and also hindering transformations (identified in 30% of instances). Several examples are described here.

1. The Green Revolution: The increased interest in "scientific agriculture" and its adoption by the Rockefeller Foundation and by national governments resulted in the use of science for modernizing, replicating and extending development solutions around the world, especially in the Global South. The dissemination of the technology rested on the existence (and strengthening) of national agricultural extension programs and associated institutions.

2. The Fair Trade movement: The Fair Trade market model represents an attempt to transform inequities embedded in traditional agribusiness supply chain. Studies indicate that in this case, the effectiveness of conventional market actors and the relative weakness of national and sub-national level institutions has resulted in a dilution of the Fair Trade effort. Larger corporations have been able to partially co-opt the intent and structure of the Fair Trade movement, leading some to conclude that it has not been able to achieve the transformative intent (Jaffee and Howard, 2009).

3. Institutional structures for food security in South Africa: The institutional context for new policies and programmes intended to strengthen food systems clearly play a crucial role in their success. In the case of the *Integrated Food Security Strategy* in South Africa the existing institutional structures, though becoming more multi-level that support or are tasked with implementing the strategy “are not sufficiently flexible or coordinated to deal with an issue as multi-scalar and multidisciplinary as food security” (Pereira and Ruysenaar, 2012, p. 41).

4. Food security policies in Brazil: Food policies aimed at strengthening food security have been a core part of significant social reforms in Brazil. According to Sonnino et al. (2014) “food security policies are embedded into a “reflexive governance” framework that facilitates learning, adaptation and collaboration between actors at different scales and stages of the food system” (p. 1).

The Green Revolution (1) and Fair Trade (2) examples are more concerned with the influence of and control by international power structures over the food production and distribution.

The South African (3) and Brazilian (4) examples, however, focus on domestic food security and with their different institutional settings that appear to be hindering change in former and promoting transformation in the latter, they warrant closer observation over the next few years.

Lock-in to reigning paradigm

Transformation is clearly affected by the strength of existing structures on system dynamics. Depending on the context, the existing paradigm of system interactions may be reinforced by social norms and interactions, controls on resources, institutional inertia, as well as actors who wield influence through resource allocation, institutional design and the values that justify these. In the cases we reviewed, such 'lock-in" can be seen in the issue of multifunctionality and the European Common Agricultural Policy: here, multifunctionality represents a challenge to existing institutional arrangements, but as yet has met with significant obstacles because the existing system is unable to adopt alternative principles for institutional development supporting sustainable practices and policies.

Transformations have also been restricted by lock-ins within the Fair Trade system. The dominance of the conventional "market-driven' buyers and organisations has meant that these actors have much greater control of the market for these products (Bacon, 2010). Several scholars have explained how the expansion of Fair Trade has in some senses undermined its initial goal as representing an alternative to the conventional supply chain. Rather than fundamentally transforming conventional trade networks, it has been incorporated into such trade networks as an additional niche market opportunity. The result has thus been uneven for producer welfare and for consumers.

3.2.3 Conditions

Next, the conditions (single or combinations thereof) associated with mechanisms that facilitated or hindered a transformation towards more sustainable food systems in terms outcomes of food systems were identified. **Collective action** emerged as the most common mechanism in the empirical studies examined- half of the literature reviewed made direct or indirect reference to it as an important element. In 20 to 25% of the literature reviewed, the following conditions were identified: **external sources of innovation, disruption of inertia; capacity for collective reflection; communication infrastructure;** and **capacity for local**

and regional self-governance. The remaining elements, presence of boundary organisations (9%); polycentric governance (18%) and better mechanisms for risk sharing (15%) appear to be less significant or non-existent conditions in the literature reviewed. Only collective action is described in more detail as it appeared to play a role at least as twice as often as the other conditions.

The importance that collective action plays in social change is profiled in a wide array of literature. According to Woolthuis et al. (2005), the "[k]ey to the evolution of new social relationships and structures is the role of collective action..." This is supported by a number of authors who have examined transformations in food systems (e.g., Ostrom and Walker, 2000; Hassanein, 2003).

Turning attention back to social motives for collective action, the studies examined suggest that collective action often begins with the development of local, regional and international solidarity for a specific purpose or cause, and, in doing so, engaging stakeholders in planning and policy activities. This, in turn, can lead to gaining more control over essential resources including food (Sage, 2014). Sage identifies this process as helping to strengthen social capital, build resilience and enhance community security. An example is the Local Food programme, which is being delivered by the Royal Society of Wildlife Trusts in England (Kirwin et al., 2013). Launched in 2007, the programme allocates grants for food-related projects to provide communities with affordable, locally-produced food. The primary elements of the programme are "local foods, community enterprises, economic activity, health and education/learning programme, all with the intention of improving local environments, developing a greater sense of community ownership and encouraging social, economic and environmental sustainability" (p. 832). Hence, the ability to develop effective local partnerships such that communities become social agents through increased "awareness, engagement and ownership" (p. 836) is considered a key to the success of the projects.

With a focus on rural agriculture, Wiskerke et al. (2003) investigated the environmental co-operatives in the Netherlands that began emerging in the early 1990s as a new form of rural development and governance based on self-organisation and self-regulation. The cooperatives examined are a network of local, regional and national government agencies and farmers. "Their aim is to integrate environment, nature and landscape objectives into farming perspectives from a regional perspective" (p. 10). Until the early 2000s self-regulation had not

been achieved due to insufficient ministerial support at the national level. They concluded that the public-private reciprocity needed for self-regulation "demands mutual trust, legitimate representation, a trustworthy government and credible accountability" (p. 21).

Despite the more general critique of Fair Trade's capacity to fundamentally transform trade networks, Fair Trade has achieved important transformations in discourse and governance, as well as outcomes in farm communities in specific supply chains. These successes have been attributed primarily to the following mechanisms: collective action/organizing efforts, risk sharing in the context of market uncertainty, communication infrastructure, and the ability for reflection between and among global North and South actors (Bacon, 2010; MacDonald, 2007; Taylor et al., 2005). MacDonald (2007), for example, examined Fair Trade coffee and discusses collective (North-South) action in the context of trade relations. Fair Trade has relied on established transnational NGOs that are responsible for constructing a "transnational architecture" for the Fair Trade market supported by international advocacy campaigns that promote trade justice. These campaigns have stimulated "new norms of consumer responsibility by 'plugging in' to existing institutional infrastructures at sites of consumption such as neighbourhood and municipal organisations, schools, universities, churches and wider informal social and civic networks" (MacDonald 2007, p. 798). Furthermore, they place significant social pressure on corporate actors to alter their norms. "The strengthening of producer co-operatives resulting from both direct support for organisational capacity building and ongoing access to markets paying sustainable prices often generates substantial 'multiplier effects', as strengthened producer organisations are then able to access additional resources from beyond the Fair Trade system" (ibid. p. 780). An important limitation identified by Auld (2010) is that participation in new forms of governance appears to favour organizations that are already capable of managing new opportunities, but that it does not necessarily support those who most need it (i.e. producers in the global South and their communities).

While not a complete transformation, a change in governance was documented by Clapp (2003) as a result of the 2000 Cartagena Protocol on Biosafety which was intended to regulate the trade of genetically modified organisms (seeds and foods). The result – a weak and vague set of rules – was less than hoped for by governments of the EU and developing countries, but was the successful outcome of a process of collective action on the part of the industry groups

involved – mainly seed producers, grain traders and food processors. This is a small example of how collective action motivated by corporate self-interest is a powerful tool in the hands of industry.

3.2.4 Governance transformation

Institutions (50%), **actor networks** (59%), and **cooperation and coordination structures** (62%) were indicated in the review as the main elements of governance that were transformed. While significantly less, there was still substantial proportion (over one-quarter) of the literature reviewed that referred to the remaining two governance elements of **multi-level interaction** (29%) **and cross-sectoral integration** (27%). Hence all are reviewed in this section, and because many examples are related to more than one of these elements, they are not addressed separately here.

Institutional Change and Actor Networks

As indicated above, at least half of the literature reviewed alluded to institutional change and actor networks as the domains of the food system in which transformations occurred. The changes in these two aspects as part of governance in the transformed systems are addressed. They have been combined in this section as they are often referred to directly or indirectly in the contexts of most of the themes investigated and are often difficult to separate. Much of the literature refers to the shift in ownership and power in all areas of the food system from the public to the private sector, and thereby the new actors involved. Gillard and his colleagues (2016) who examined climate governance have placed strong emphasis on the need for change in power structures and societal norms for successful transformations (generally and not just for climate mitigation and adaptation).

The **Green Revolution** was originally the product of international collaboration between philanthropic and international and national public sector agencies. It was the alliance between international scientists (geneticists, agronomists, and economists), philanthropic and international and national public sector agencies. In the absence of sufficient international governance bodies, the Green Revolution stimulated the establishment of international public goods organisations to fill the governance gap. Examples include the International Maize and Wheat Improvement Center (CIMMYT) in Mexico, the International Rice Research Institute

(IRRI) in the Philippines and the Consultative Group for International Agricultural Research (CGIAR) with its headquarters in Washington (Pingali, 2012).

In general, in the second wave of the Green Revolution, progressively more power has been transferred to or taken by non-state actors in all parts of the food system. This includes regulatory authority shifting from states to private enterprise and NGOs (Schilpzand et al., 2010). Non-state actors, such as the Gates Foundation, have also assumed state roles and power without accountability. Science has supported the process by providing a scientific basis for investments in technical developments that could subsequently be commodified (e.g., genetic engineering). The fundamental goal of the Green Revolution now is economic growth by investing not only in agricultural technologies and genetic material but also in market infrastructure and the companies that can promote this (Smith, 2009).

Coinciding with these market-oriented initiatives has been the growth in demand for sustainable agricultural production and for sustainable supply chains as a whole which has brought diverse actors together to develop joint solutions. For example, the entire palm oil commodity chain has been encouraged to join the Roundtable on Sustainable Palm Oil (RSPO), which was formed in 2004. The Roundtable comprises representatives of "plantation companies, processors and traders, consumer goods manufacturers and retailers of palm oil products, financial institutions, environmental NGOs and social NGOs, from many countries that produce or use palm oil" (RSPO website - http://www.rspo.org/).

Sustainable agriculture, in general, has necessitated cooperation between government, industry and academia (Juma, 2015). It has stimulated a horizontal shift to private and semi-public organisations including environmental cooperatives and new forms of rural and local governance (Wiskerke et al., 2003). For example, community garden initiatives have raised awareness and interest in sustainable food. Food policy councils are also a relatively new form of urban governance, often implemented as joint initiatives of local governments and community groups (such as community garden initiatives) to promote sustainable food systems, that undertake research, education, lobbying, food-related services and community development. Sage (2015) refers to the food policy council as "an organizational initiative that has the potential to bridge the gap between food producers and consumers" (p. 1). These councils were introduced in North America in the 1980s and have more recently been

launched in a growing number of European cities (e.g., Cork, Amsterdam, Berlin and Cologne).

Similarly, the food sovereignty movement has led to the emergence of local citizen groups, the engagement of local and regional governments and the development of reflexive forms of governance (Sage 2014). Under such a system, the result is that retailers have less power and consumers more power to choose sustainably-produced food (Lang, 2010). The governance of food, in the words of Pereira and Ruysenaar (2012, p. 53), "...is no longer purely the ambit of the state, but lies in the complex articulation between the state, the private sector, international institutions, and civil society and the state requires capacity in order to manage these relationships." Furthermore, the partnership among diverse stakeholders for the purpose of local food systems can have a significant influence on the food policies of local governments (Kirwan et al., 2013). Social innovations at the local and grassroots level provide ample evidence of the importance of involving diverse local actors and stakeholders (Kirwan et al., 2013). Strengthening these networks in order to share best practices and stimulate the exchange of knowledge prevents the isolation of those who wish to promote innovations in food systems in the interest of food sovereignty (Sonnino et al. (2014).

Fair Trade provides an excellent example of the introduction of new institutions in the form of new rules of trade (MacDonald 2007), third party verified certification schemes and price premiums (Bacon 2010, Auld 2010). Corporations have also responded by modifying their commercial practices in order to participate in the Fair Trade market, at least initially (Jaffee and Howard, 2009). In addition to industry representatives and governments, Fair Trade has introduced an array of new actors in the governance of this food system including NGOs (aid organizations and environmental groups), producer organizations (farmers, agricultural cooperatives) and consumer groups (MacDonald, 2007; Auld 2010).

Cooperation and coordination structures

Our review revealed numerous references to forms of governance involving increased cooperation among actors and new coordination structures**.** Several examples are summarised here.

The dominance of market-based governance modes (McMichael, 2012) has, among other things, facilitated the development of agrofuels in the first decade of this century with the

formation of new corporate structures supporting this lucrative product line (McMichael, 2009). The profitability of another new agrifood product, GMOs, has benefited from the merging of corporations, such as Dupont and Dow Chemical, that previously competed with each other for their share of the pesticide market (Clapp, 2013). As Clapp points out, the development of regulations on pesticide use and planting of GMOs has involved cooperation between transnational corporate interests and organisations involved in global environmental governance. While these are developments that benefitted from cooperation and coordination structures they are not the type of transformations that fit with our definition of sustainable food systems.

A related development is that of foreign investors as land owners in the Global South, but increasingly in Europe too, and normally facilitated by national governments. The so-called land grabbing phenomenon has been a remarkably successful result of synergies between the interests of international private and public sector interests, and local organizations and actors to permit foreign control over large tracts of land and water for the purpose of exporting agricultural products (McMichael, 2012; Cotula et al., 2009). Although the phenomenon has become of increasing note following the 2007-2008 food crisis and criticised as a form of neocolonialism, it is not new historically speaking. However, this transformation in control of resources can be seen as a new form of cooperation between elites in national governments and foreign entities, and often involving private enterprise as the direct beneficiary of these arrangements.

At the same time and rather paradoxically, we see increased social pressure for more secure and sustainable food systems has also led to the emergence of new governance modes characterized by decentralisation and by increased collaboration and knowledge sharing among stakeholder groups at the local scale. For example, adaptive governance based on local stakeholder participation and facilitating local network/consortia development referred to by Duru et al. (2015); the integration of new actors into governance systems including processors, retailers, wholesalers, and transporters (Sonnino et al., 2014); and, related to the former, a strengthening of the relationship of local producers and retailers (United Nations Conference on Trade and Development, 2013).

The Fair Trade movement introduced new modes of governance including the establishment of the Fair Trade system and organizations (MacDonald 2007). Fair Trade has made possible

the standardization of environmental and social values in production and trade (Auld, 2010). Among the largest organisations at the international level are the Fair Trade Labeling Organization and the Rainforest Alliance that establish certification schemes with associated governance bodies involving NGOs and farmers/farm cooperatives (Bacon, 2010). Taylor (2005) has pointed out the significant reorganization that has taken place in how these actors coordinate and control along the commodity food chain. Individual farmers are now linked by a network and involved in a new rural governance system. Nonetheless, weaknesses have been identified over time including the distance of the Fair Trade governance bodies from the target producers (Jaffee and Howard, 2009).

Given the significant success of the Fair Trade movement, it has not taken long for the corporate sector to exploit mechanisms to co-opt Fair Trade and organics including regulatory capture and the weakening of the standards for certification by exerting pressure for harmonisation (Jaffee and Howard, 2009). This has been a lesson for the food sovereignty and food security movements as a whole. One response to this form of co-optation and more generally to concentrations of power over food-producing resources is the evolution of a direct market movement as part of a larger social economy, in which consumers in the Global North –either private or public organisations – make arrangements for sourcing goods directly with the producers (either individual farmers or communities) in the Global South. Naturally this innovation involves new relationships and new forms of cooperation between actors as well as new ways of coordinating market activities.

Multi-level interaction and Cross-sectoral integration

Fair Trade once again provides an excellent example of the effectiveness of multi-level interaction and cross-sectoral integration. The movement has enhanced the empowerment of labour through producer constituencies in global trade, and because of the attention given to social welfare it is also multi-sectoral (Macdonald, 2007). Through the development of new governance arrangements, most notably the World Fair Trade Organization, Fair Trade Organization (FLO International) and the Rainforest Alliance, verified certification schemes for production and trade have been developed through the collaboration of labour organisations, farmers and farm cooperatives, aid organisations, environmental groups, together with industry and government representatives (Auld 2010; Bacon 2010).

Kania and Kramer (2011) refer to the importance of collective impact in large-scale social transitions which can be seen to have elements of both multi-level interaction and cross-sectoral integration. Collective impact is defined by the authors as "the commitment of a group of important actors from different sectors to a common agenda for solving a specific social problem" (p. 36). These initiatives, which the authors provide several examples of, "involve a centralized infrastructure, a dedicated staff, and a structured process that leads to a common agenda, shared measurement, continuous communication, and mutually reinforcing activities among all participants." (p. 38). Cross-sectoral coordination is an essential element. While the authors point to insufficient empirical evidence of the effectiveness of collective impact, the examples they provide suggest the approach has much potential in addressing complex socio-environmental problems but is not often undertaken. For example, the Mars corporation, one of the largest manufacturers of chocolate brands, collaborated with governments, NGOs and other businesses (including some competitors) to improve the livelihoods of cocoa farmers in Cote d'Ivoire. In another food-related case they identified, a US municipality, Sommerville, Massachusetts used a multi-stakeholder process to collectively define "wellness and weight gain prevention practices" among primary school children (p. 38). A question to be explored is why such an initiatives are not more frequently undertaken and what could be done to stimulate more initiatives in collective impact.

In the case of the sustainable agriculture movement, Juma (2015) stresses the importance of cooperation among government, industry and academia. Wiskerke and colleagues (2003) point to the role played by sustainable agriculture in the creation of environmental co-operatives and new systems of rural governance. They also stress the vertical shift to more local governance and the horizontal shift to private and semi-public institutions supporting sustainable agriculture.

3.2.5 Transformation in activities

In general, the entire supply chain, from production to distribution to consumption, has been affected by transformations in the activities within the food system over the last half century, and particularly in the last two decades. Nonetheless, the focus remains on production with over 75% of the literature reviewed focused exclusively or primarily on this end of the system. Distribution is addressed in 44% of cases and consumption in 38% of the literature

solely or in addition to the one or both of the other two phases. Hence all three are discussed in this section.

While the first wave of the Green Revolution focused on production, the second wave in the 1990s and 2000s, is transforming not only production (e.g. via technological change) but also what is consumed – for example, through the promotion of rice in Africa (Smith 2009). In the case of palm oil, which is also a high-profile second wave Green Revolution product, the RSPO certification (described in section 3.2.4) has focused on transformations in activities along the entire supply chain, entailing new financial practices, new forms of environmental monitoring, changing production practices and product marketing (Boons and Mendoza, 2010).

Clearly the shift towards more industrialised production globally has gone hand-in-hand with increasing exports of agro-products (McMichael, 2012). At the same time, the parallel shift towards more environmentally-friendly farming practices has served to support both local farming activities and diversification in production (crops and livestock), thus moving away from the dominance of corporate agri-business and monoculture (McMichael 2011; Duru et al 2015). Another advantage of moving towards local farming, mentioned by Kirwan et al. (2012), is that little in the way of distribution is necessary. The food sovereignty movement has served to reconnect people to place and to ecological endowments, has seen consumers become producers and distributors (Sage 2014).

At the international level, the Fair Trade movement has resulted in a significant shift in the nature of food production with a ban on the use of some or all chemicals and improvements in producer income well-being in general and in labour practices (Jaffee and Howard, 2009; MacDonald 2007). Fair Trade has also had an influence in changing values and norms in supply chain including distribution via the "demonstration effect" of marketing success. On the consumption side, it has influenced consumer values and preferences (MacDonald 2007). While Fair Trade Fair Trade affects a very small percentage of the total food, the market for these products as well as the notion have grown steadily over the past two decades with even more rapid growth in the 2000s. The transformation has however been hindered, according to MacDonald (2007), by the fact that the Fair Trade system has been focused on transforming governance within rather than beyond the institutional boundaries of transnational supply

chains. It is, she points out, the actors beyond the supply chains (for example, policy actors in national governments) that influence empowerment or disempowerment of producers.

In their review of the effectiveness of collective impact (defined in the previous section), Kania and Kramer (2011) identified several cases to exemplify this, two of which involved food and concerned with production and consumption respectively:

1. The cocoa production example involves the Mars Corporation in collaboration with NGOs, local governments, and competitors to alleviate poverty among 500,000 farmers in Cote d'Ivoire. With improved farming practices and stronger plants, it was estimated that farmers could triple their yields. To achieve this "the Cote d'Ivoire government needs to provide more agricultural extension workers, the World Bank needs to finance new roads, and bilateral donors need to support NGOs in improving health care, nutrition, and education in cocoa growing communities. And Mars must find ways to work with its direct competitors on pre-competitive issues to reach farmers outside its supply chain." (p. 38). While not yet providing sufficient evidence of transformed activities, the results of this programme would be worth following up on.

2. On the consumption side, the reduction and prevention of obesity among primary school children was the objective of a municipality of Massachusetts. Through a collective effort, healthier foods were offered in schools, nutrition was introduced in the curriculum and physical activity promoted. Infrastructure was improved to make it easier for children to walk to school. A certification system was introduced for restaurants serving nutritional, low-fat food, and the City launched a farmers' market.

3.2.6 Transformation outcomes

In examining the outcomes of food-related transformations, **social welfare** (income, employment, wealth, social capital, political capital, and human capital) was the most evident change to occur in within the various movements and then of course mostly in a positive direction, appearing in half of the cases reviewed. This was followed by **environmental sustainability** including preservation of natural capital in 35% of cases reviewed, and **food availability** (in terms of production, distribution and exchange) in 32% of cases. Somewhat surprisingly, food security was referred to in just 20% of articles and chapters reviewed.

Access to food (affordability, allocation, preference) was discussed in 27% of cases, resilience in 12% and food utilization (nutritional value, social value, food safety) in 6%.

Social welfare is of course a driver of **Fair Trade**, and normally goes hand in hand with environmental sustainability for the physical health of producers (e.g., reduced exposure to chemicals) and their economic well-being (i.e. maintaining agroecosystem health). Those who have been looking closely at the benefits have focussed particularly on income, empowerment and the wider effects of Fair Trade on the global market.

At an international level, Macdonald (2007) points to the improvements in the transfer of wealth (in terms of volume and stability) from consumers to producers manifest in investments. At a local level, Cespedes & Fair Trade Assistance (2005) measured a small increase of about 10% in producer incomes in a study comparing household income levels of Fair Trade-certified coffee producers in Nicaragua and those not involved in Fair Trade. Bacon (2010) however identified the stagnation in Fair Trade premiums over time which has hampered growth in income for farmers. The extent to which this is linked to the fact that product prices are insufficient to compensate for increased production costs is not clear from the literature reviewed. Another potential limitation imposed by Fair Trade, is that the environmental costs and benefits must be subsidized, and these subsidies may inhibit transitions by producers to other agricultural products, for example, from coffee to another more economically viable product (Auld 2010).

Fair Trade has brought about greater collaboration, empowerment and increased access to resources and information have been the result of participation in and capacity building by producer organizations including capacity for collective action (MacDonald 2007, Bacon 2010, Taylor et al. 2005). It has resulted in and new linkages to "intergovernmental processes and innovation in social movements (Auld 2010). However, the research of Auld (2010) suggests that the introduction of Fair Trade may be undermining customary practices in communities and in some cases including local/traditional governance in FT criteria. Some argue that certification is simply reinforcing existing social capital and inequities in (some) rural areas and not helping those who need it most. "There is no reason to believe that certification has determined the best institutional solution to all the problems in the coffee sector in its current form. The innovative dynamism of the organisations involved may,

however, be a great strength that will enable constant adaptation and learning to improve efforts to govern…" (Auld 2010, p. 229)

Fair Trade movement has resulted in increased awareness and the dissemination of sustainability values to and the adoption of Fair Trade principles by conventional markets (Bacon 2010, Taylor et al. 2005, Auld 2010) but with mixed results. Certainly, it has by pressure and example led to the introduction of new corporate practices. The co-optation by corporate interests observed by Jaffee and Howard (2009) and noted in section 3.2.4, has also resulted in a diluting of ethical and environmental standards associated with Fair Trade products, and accordingly the weakening of the social welfare benefits of Fair Trade.

Despite the intended goals of the **Green Revolution** in terms of increased availability of food and poverty reduction, there have been unintended consequences. Excessive water use, soil degradation, and chemical runoff have had serious environmental impacts in and beyond the areas cultivated (Pingali 2012). The benefits have also been limited in achieving greater equality: (Sisaye and Stommes 1985) pointed out that land well suited to agriculture was selected and the poorer regions were neglected thus resulting in unequal access and benefits of the Green Revolution. Thus, yields in some areas increased but food security did not.

The **social protection** agenda of the 2000s focused on enhancing food security (Devereaux 2015). In the local food programme run by the Royal Society of Wildlife Trusts in England (see section 3.2.3), a greater variety of healthy, locally-produced food was made available in the communities and regions where projects were funded (Kirwan et al. 2013). As a result of the success of these grassroots projects, the programme, in addition to boosting local food production, is “seen as a vehicle for community cohesion, regeneration, healthy eating, educational enhancement and integrating disadvantaged groups into mainstream society and economy” (Kirwan et al. 2013, p. 836). Similar success was seen in the outcome of the comprehensive community-wide nutrition programme examined by Kania and Kramer (2011) and summarized in section 3.2.5, “was a statistically significant decrease in body mass index among the community’s young children between 2002 and 2005” (p. 38).

In looking at transformations in **land use**, the capitalist agrarian food regime and the associated neoliberal accumulation have, in the 21st century, seen to a decline in access to food for local populations and the resulting displacement of rural people in the Global South (McMichael 2012). On the other hand, McMichael (2011) also points out that support of local

and diverse farming activities embracing environmentally friendly practices has grown and protects to some extent against the dominance corporate agri-business and mono-culture.

Literature covering the **food sovereignty** movement points to positive developments in all of the elements under transformed activities (social welfare, food availability, environmental sustainability, etc.), in particular Sage (2014) who has taken a broad look at the transition movement in the context of food sovereignty. Kirwin et al. (2013) who examined grassroots social innovations and food localisation also make reference to most elements. In Brazil, reflexive governance systems and, accordingly, the decentralization of administrations and policy-making have "empowered new communities of food producers (i.e., family farmers who were previously excluded from mainstream markets) and consumers (i.e., the CAEs and dietitians), who are working together to address their context-specific needs and to build capacity" (Sonnino et al 2014, p. 8).

In the literature examining progress in **sustainable agriculture** we observe a linking of environmental benefits and social well-being. Juma (2015) refers to the development of migration corridors in Africa to facilitate ecosystem integrity and protect human health. Duru and colleagues (2015) point out that local-scale food systems based on "tight feedback loops" that link producers, consumers and ecological effects, are resilient to exogenous changes and are characterised by high levels of food sovereignty and autonomy.

4. Insights from the review and further research

This report has summarised a review of the literature on why and how governance systems transform, and the potential pathways for transformations (in governance) towards sustainable food systems. In this final section we summarize what we have learned from this preliminary review, and the areas of focus for a subsequent, more comprehensive review.

4.1 What did we learn?

Consistent with much of the socio-ecological systems transformation literature, significant change – transformational change – in food systems is often triggered by a shock to the system, or increasing pressure (the pressure-release model of change). But this alone is unlikely to generate transformational change. There needs to be a degree of "wealth" or capital in the system – resources that can be mobilized, and sufficient flexibility in the institutional context that innovation is allowed to emerge and gain strength. We notice the importance of collective action, as well as collaboration across geographical scales and interest groups in realizing transformation. Thus, rather than conflict (i.e. rebellion leading to transformation) the channels that are documented emphasize collaboration, social capital, and the development of institutional arrangements to consolidate those social relations.

Collective action (or collective impact as it is also known) stands out both in this analysis and that of the complementary CCAFS study by Delaney et al. (2016) as a vehicle for more effective and equitable management of food systems. Its potential is often overlooked because funders and non-profits tend to be fixated on independent action and solutions as the means of achieving social change according to Kania and Kramer (2011).

Turning attention to the outcomes of transformations, we find that the social relations and institutions are often the focus of transformation and that are also the ones that are most transformed. While the finding on the role of social relations and institutions is in part highlighted because of our focus on governance in this review, our selection of food system transformation cases was not limited to those in which governance was the object of transformation. Nevertheless, the essential ingredients of food system governance surfaced repeatedly as critical to stimulating, constraining, and enabling change as well as being the recipient of change processes. This finding underscores the critical importance of focusing on

governance in any effort to achieve fundamental shifts in food system outcomes—i.e., resilience, security, stability, adaptation.

Relating these changes to actual material outcomes in food security is more challenging and perhaps slower to materialize. As noted in the CCAFS Delaney et al. study (2016), the outcomes of food system transformations are often not explicitly mentioned. Perhaps part of the reason that outcomes receive less attention is, according to Brown et al. (2013, p. 104), "that transformation is rarely a discrete and tidy event. It may be a process triggered by a specific event but which develops messily over time and space." Food system outcomes range from the intangible – e.g., new social relations, new discourses, new values and priorities – to the material – e.g., technological shifts, land change, economic welfare and ecological states. Attributing specific outcomes to change in governance arrangements is difficult.

Hospes and Brons (2016) in their reflections on food system governance have emphasized the centrality of use and distribution of power. Certainly this has been a recurring theme throughout the review presented in this paper. The rise of private sector actors and the corresponding role of private governance in the context of global regulatory systems provides the framing for much of the food system now. Against this backdrop, they also stress that food policy is fragmented, productionist and has little involvement by civil society. Hence corporations with their excessive power have little incentive to address ecological and social crises. Urban governance is also not engaging the public in decision-making concerning food systems.

4.2 Priority research areas

Having obtained some further insights into transformations of food systems and food system governance, we propose a number of key areas and guiding questions for further investigation in future studies:

1. To what extent are challenges related to transformations in food system governance specific to food systems? What can be learned from (or transferred to) transformations in other sectors?

2. What are major drivers of and barriers to change – in production, distribution or consumption? In the process of transformative change, how can change be initiated, monitored and sustained?

3. How can the dynamics of factors that lead to a system shift be monitored over time in order to anticipate tipping points?

4. What might in depth analyses of transformation in distribution and consumption tell us about food system transformation? Given the significant role that consumption patterns play in today's food system, understanding the role of governance in consumption shifts may be fundamental to understanding food system change.

5. What is the potential of collective action/impact in facilitating transformations and what are the implications for governance?

6. How are the three main preconditions identified in this review (access to resources, effectiveness of formal institutions and lock in to a reigning paradigm) interlinked? Should all three or only one or two be fulfilled in order to lead to a transformation in governance of food systems, or are they interchangeable?

7. What can we learn from multi-stakeholder initiatives and alternative supply chain innovations about successful models of food system governance?

Appendix 1: Summary of IST 2016 Conference Session, Wuppertal

As mentioned in section 1 of this report, a conference session on the theme of this study was organised at the International Sustainability Transformations conference in Wuppertal in September 2016. The presentations in this session listed below are summarized briefly in this section.

"Management and governance of transformations to sustainable food systems" (based on this scoping report) presented by Caroline van Bers and Claudia Pahl-Wostl, Institute of Environmental Systems Research, Osnabruck University

"Navigation and governance in transition processes towards more sustainable food production and consumption in Denmark" presented by Michael Søgaard Jørgensen, Center for Design, Innovation and Sustainable Transitions, Aalborg University

"Towards integrated food policy: a research agenda" replacing the original presentation, "Governing the transition towards sustainable food systems: a plea for coordinated fragmentation" presented by Jeroen Candel and Laura Pereira, Public Administration and Policy Group, Wageningen University

The **first presentation** on management and governance of transformations to sustainable food systems was based on the research presented in this scoping paper. Several valid questions were raised including what qualifies as a transformation. The definition has been provided in section 2.2 of this report. Other questions included if organic agriculture was included in our study, what the geographical scale of transformations examined was, and from what perspective we looked at power structures.

The **second presentation** on the transition to production and consumption of organic food in Denmark focused on the extent to which this transition has occurred (currently 6-7% of agricultural land and substantial market shares) and what the barriers to advancing this transformation are. There has, for example, not been a substantial change in the Danish diet away from animal products. Barriers to a further transition of from conventional to organic agriculture is specialized conventional agriculture and its focus on meat and dairy production

and export, and employment in these areas, despite the fact that the income of many conventional farmers is very low compared to organic farmers. On the positive side, the Danish meat industry and retailers have developed an alliance with NGOs to develop guidelines for sourcing of so-called “responsible soy”.

The **final presentation** on a research agenda for integrated food policy identified four factors driving the need to govern for transformations in the food system: persisting social, environmental, and economic crises in food system; recognition that ‘siloed’ policy efforts and governance arrangements fall short; awareness of crosscutting/ boundary-spanning nature food, and emerging calls for ‘integrated’, ‘holistic’, ‘coherent’, ‘joined-up’ food policy. The authors identified five dimensions for policy integration needing attention:

1. developing a policy framework;
2. involving multi-sectors & multiple levels;
3. identifying where policy integration is needed and where policy specialization is better;
4. formulating policy goals; and,
5. developing a mix of instruments that are compatible and achieve these goals.

The authors stress that achieving policy integration is a significant challenge especially given diverse conceptions and priorities among decision makers.

In the final round of the session there was insufficient time for a round table discussion. A few questions from the audience could be considered by the authors in their current or subsequent studies:

- What is at the core of local and integrated food policies? What kinds of concerted actions are needed among actors and sectors
- How is research informed by supranational organizations?
- What are the underlying assumptions of the research presented with regard to planetary boundaries?
- Two of the original discussion questions that we posed for this session have been added to the list of questions for further research in the final section of this report.

References

Auld, G. 2010. Assessing certification as governance: Effects and broader consequences for coffee. The Journal of Environment Development. 19: 215-241.

Bacon, C. 2010. Who decides what is fair in Fair Trade? The agri-environmental governance of standards, access, and price. Journal of Peasant Studies 37:111-147.

Biermann, F., K. Abbott, S. Andresen, K. Bäckstrand, S. Bernstein, M.M. Betsill, H. Bulkeley, B. Cashore, J. Clapp, C. Folke, and A. Gupta, 2012. Transforming governance and institutions for global sustainability: key insights from the Earth System Governance Project. Current Opinion in Environmental Sustainability, 4(1), pp.51-60.

Brown, K., S. O'Neill, C. Fabricius. 2013. Social science understandings of transformation. In Part 1: The complexity and urgency of global environmental change and social transformation. World Social Science Report 2013. Changing Global Environments. SSC, UNESCO. 100-107.

Brown, L. 2009. Plan, B. 4.0: Mobilizing to Save Civilization. WW Norton & Company.

Boons, F. and A. Mendoza. 2010. Constructing sustainable palm oil: how actors define sustainability. Journal of Cleaner Production, 18(16-17), 1686–1695.

Candel, J.J. 2014. Food security governance: a systematic literature review. *Food Security*, *6*(4), pp.585-601.

Cespedes, P.V. and F.T. Assistance. 2002. Fair Trade Impact: The Nicaraguan Case. Managua: American Consulting Group.

Clancy, K. 2014. Food system governance. Journal of Agriculture, Food Systems, and Community Development, 4(2), 3–6. http://dx.doi.org/10.5304/jafscd.2014.042.012

Clapp, J. 2003. Transnational corporate interests and global environmental governance: negotiating rules for agricultural biotechnology and chemicals. Environmental Politics 12:4, 1-23, DOI: 10.1090/09644010412331308354

Cleaver, H. 1972. The Contradictions of the Green Revolution. The American Economic Review. Vol. 62, No. 1/2 (Mar. 1, 1972), pp. 177-186

Cotula L, S. Vermeulen, R. Leonard, J. Keeley. 2009. Landgrab or development opportunity: agricultural investment and international land deals in Africa. Food and Agriculture Organization (FAO) IIED, IFAD. http://www.ifad.org/pub/land/land_grab.pdf

Delaney A, T. Evans, J. McGreevy, J. Blekking, T. Schlachter, K. Korhonen-Kurki, P. Tamás, T.A. Crane, H. Eakin, W. Förch, L. Jones, D.R. Nelson, C. Oberlack, M. Purdon. 2016. Strengthening the food systems governance evidence base: Supporting commensurability

of research through a systematic review of methods. Working Paper no. 167. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

Devereux, S. 2016. Social protection for enhanced food security in sub-Saharan Africa. Food Policy. 60. DOI: 10.1016/j.foodpol.2015.03.009

Duru, M. and O. Therond. 2015. Designing agroecological transitions; A review. Agronomy for Sustainable Development, 35(4), pp.1237-1257.

Ericksen, P.J., J.S. Ingram,. and D.M. Liverman. 2009. Food security and global environmental change: emerging challenges. Environmental Science & Policy, 12(4), pp.373-377.

Ericksen, P. J. 2008. What is the vulnerability of a food system to global environmental change? Ecology and Society 13(2): 14.: http://www.ecologyandsociety.org/vol13/iss2/art14/

Freebairn, D.K., 1995. Did the Green Revolution concentrate incomes? A quantitative study of research reports. World Development, 23(2), pp.265-279.

Gillard, R., A. Gouldson, J. Paavola, and J. Van Alstine. 2016. Transformational responses to climate change: beyond a systems perspective of social change in mitigation and adaptation. Wiley Interdisciplinary Reviews: Climate Change, 7(2), pp.251-265.

Hassanein, N., 2003. Practicing food democracy: a pragmatic politics of transformation. *Journal of Rural Studies*, 19(1), pp.77-86.

Hospes, O. and A. Brons. 2016. "Food system governance: A systematic literature review". In: Kennedy, A. & Liljeblad, J. (ed.). Food Systems Governance: Challenges for justice, equality and human rights. London: Routledge.

IPCC, 2014: Annex II: Glossary [Mach, K.J., S. Planton and C. von Stechow (eds.)]. In: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, pp. 117-130.

Jaffee D. and P.H. Howard. 2009. Corporate cooptation of organic and fair trade standards. Agric Hum Values. DOI 10.1007/s10460-009-9231-8

Juma, C., 2015. The new harvest: agricultural innovation in Africa. Oxford University Press.

Kania, J. and M. Kramer. 2011. Collective Impact. Stanford Social Innovation Review. http://www.ssireview.org/articles/entry/collective_impact

Kirwan, J, B. Ilbery, D. Maye, J. Carey. 2013. Grassroots social innovations and food localisation: An investigation of the Local Food programme in England - Global Environmental Change. 23 (2013), pp. 830–837.

Lang, T. 2010. Crisis? What Crisis? The Normality of the Current Food Crisis. Journal of Agrarian Change. 10(1), pp.87-97.

Liverman, D. and K. Kapadia. 2010. Food systems and the global environment: an overview, in: Food Security and Global Environmental Change.

MacDonald, K., 2007. Globalising justice within coffee supply chains? Fair Trade, Starbucks and the transformation of supply chain governance. Third World Quarterly, 28(4), pp.793-812.

McMichael, P. 2012. The land grab and corporate food regime restructuring. Journal of Peasant Studies, 39(3-4), pp.681-701.

McMichael, P. 2011. Food system sustainability: Questions of environmental governance in the new world (dis) order. Global Environmental Change, 21(3), pp.804-812.

O'Brien, K., S.E.H. Eriksen, T.H. Inderberg, and L. Sygna. 2014. Climate change and development: adaptation through transformation. Climate Change Adaptation and Development: Transforming Paradigms and Practices. Earthscan/Routledge. pp. 273 – 289. ISBN 9781138025967.

Olsson, P., L.H. Gunderson, S.R. Carpenter, P. Ryan, L. Lebel, C. Folke, and C.S. Holling. 2006. "Shooting the rapids: Navigating transitions to adaptive governance of social-ecological systems", Ecology and Society, Vol. 11/1, p. 18, www.ecologyandsociety.org/vol11/iss1/art18/

Ostrom, E. and J. Walker. 2000. Neither markets nor states: Linking transformation processes in collective action arenas. In *Polycentric games and institutions: readings from the Workshop in Political Theory and Policy Analysis* (Vol. 427). University of Michigan Press.

Pelling M. 2011. Adaptation to climate change: from resilience to transformation, Routledge, London.

Pereira, L.M. and S. Ruysenaar, 2012. Moving from traditional government to new adaptive governance: The changing face of food security responses in South Africa. Food Security, 4(1), pp.41-58.

Pingali, P.L., 2012. Green Revolution: Impacts, limits, and the path ahead. Proceedings of the National Academy of Sciences, 109(31), pp.12302-12308.

RSPO (Roundtable on Sustainable Palm Oil) website - http://www.rspo.org/ , accessed 19.04.2016.

Sage. C. 2015. Why we need food policies. Organic Matters. Issue 132, Winter 2015.

Sage, C., 2014. The transition movement and food sovereignty: From local resilience to global engagement in food system transformation. Journal of Consumer Culture, 14(2), pp.254-275.

Schilpzand, R, D. Liverman, D. Tecklin, R. Gordon, L. Pereira, M. Saxl and K. Wiebe. Ch. 18: Governance Beyond the State: Non-state Actors and Food Systems. 2010. In J.S.I. Ingram, P.J. Ericksen and D. Liverman (Eds.) Food security and global environmental change. Earthscan. London.

Scott, W.R.. 2001. Institutions and organizations. Sage.

Sisaye, S. and E. Stommes. 1985. Green revolution as a planned intervention strategy for agricultural development: A systems perspective. Public Administration and Development, 5(1), pp. 39-55.

Smith, E. 2009. Imaginaries of development: Rockefeller Foundation and Rice Research. Science as Culture. 18: 461-482.

Sonnino, R., C.L. Torres, S. Schneider. 2014. Reflexive governance for food security: The example of school feeding in Brazil. Journal of Rural Studies.

Straith, D., J. Adamowski, and K. Reilly. 2014. Exploring the behavioural attributes, strategies and contextual knowledge of champions of change in the Canadian water sector. Canadian Water Resources Journal 39 (3): 255-269.

Taylor, P.L. 2005. In the market but not of it: Fair trade coffee and forest stewardship council certification as market-based social change. World Development, 33(1), pp.129-147.

United Nation Conference on Trade and Development. 2013. Trade and Environmental Review 2013. Chapter 5 Commentary III.

Westley, F., Olsson, P., Folke, C., Homer-Dixon, T., Vredenburg, H., Loorbach, D., Thompson, J., Nilsson, M., Lambin, E., Sendzimir, J. and Banerjee, B. 2011. Tipping toward sustainability: emerging pathways of transformation. Ambio, 40(7), pp.762-780.

Wiskerke, J. S. C., B.B. Bock, M. Stuiver, and H. Renting. 2003. "Environmental co-operatives as a new mode of rural governance." NJAS-Wageningen Journal of Life Sciences 51, no. 1: 9-25.

Woolthuis, R.K., M. Lankhuizen, and V. Gilsing. 2005. A system failure framework for innovation policy design. Technovation, 25(6), pp.609-619.

World Food Summit. 1996. Rome. Declaration on World Food Security.

RESEARCH PROGRAM ON
Climate Change, Agriculture and Food Security

CGIAR

CCAFS

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a strategic initiative of CGIAR and Future Earth, led by the International Center for Tropical Agriculture (CIAT). CCAFS is the world's most comprehensive global research program to examine and address the critical interactions between climate change, agriculture and food security.

For more information, visit www.ccafs.cgiar.org

Titles in this Working Paper series aim to disseminate interim climate change, agriculture and food security research and practices and stimulate feedback from the scientific community.

CCAFS is led by:

CIAT

Strategic partner:

futureearth
research for global sustainability

Research supported by:

CGIAR Fund

Danida

European Commission

IFAD

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Agency for Development and Cooperation SDC

IICT

UKaid from the British people

Australian Government
Australian Centre for International Agricultural Research

Irish Aid
Government of Ireland
Rialtas na hÉireann
Ireland's commitment to a world without poverty and hunger

Ministry of Foreign Affairs of the Netherlands

Government of Canada
Gouvernement du Canada

NEW ZEALAND MINISTRY OF FOREIGN AFFAIRS & TRADE
MANATŪ AORERE