A transition approach towards a sustainable and healthy food system: the case of the South-Holland Food Family

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Abstract

The transition towards a sustainable and healthy food system is one of the major sustainability challenges of today, next to the energy transition and the transition from a linear to circular economy. This paper provides a timely and evidence-based contribution to better understand the complex processes of institutional change and transformative social-ecological innovation that takes place in the food transition, through a case study of an open innovation and food transition network in The Netherlands, the South-Holland Food Family (*Zuid-Hollandse Voedselfamilie*). This network is supported by the provincial government and many partners, with the ambition to realize more sustainable agricultural and food chains, offering healthy, sustainable and affordable food for everyone in the Province of South-Holland in five to ten years from now. This ambition cannot be achieved through optimising the current food system. A transition is needed – a fundamental change of the food system's structure, culture and practice. The Province has adopted a transition approach in its 2016 Innovation Agenda for Sustainable Agriculture. This paper provides an institutional analysis of how the transition approach has been established and developed in practice. Our main research question is what interventions and actions have shaped the transition approach and how does the dynamic interplay between actors and institutional structures influence institutional change, by analysing a series of closely related action situations and their context, looking at 'structure' and 'agency', and at the output-outcomes-impact of these action situations. For this purpose, we use the Transformative Social-Ecological Innovation (TSEI)-framework to study the dynamic interplay between actors and institutional structures

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influencing institutional change. The example of TSEI-framework application in this paper shows when and how local agents change the institutional context itself, which provides relevant insights on institutional work and the mutually constitutive nature of structure and agency. Above institutional analysis also shows the pivotal role of a number of actors, such as network facilitators and provincial minister, and their capability and skills to combine formal and informal institutional environments and logics and mobilize resources, thereby legitimizing and supporting the change effort. The results are indicative of the importance of institutional structures as both facilitating (i.e., the province's policies) and limiting (e.g. land ownership) transition dynamics.

Key words: transition approach, transition management, institutional change, open innovation network, food transition, transformative social-ecological innovation (TSEI), Energising Networks, short food supply chains, sustainable agri-food system, circular agriculture

Introduction

The transition towards a sustainable and healthy food system is one of the major sustainability challenges of today, next to the energy transition and the transition from a linear to circular economy. Agriculture, horticulture, aquaculture, and fisheries are essential for our food pro-duction and therefore indispensable in our society. They are an integral part of our economies and cultures. By 2050, the world will have a population of about nine billion, with rapidly changing nutritional needs. With the vast majority of consumers usually opting to pay the lowest price, it prompted the food industry in the past decades to adopt highly efficient, low-cost production methods. As a consequence, there is little incentive for actors in the food chain to invest in sustainability measures and translate those into cost price. This economic logic leads to a vicious circle and a race to the bottom. Current food consumption and production patterns contribute strongly to a number of urgent sustainability challenges in the areas of health and well-being of humans, animals, and the planet. The global food system is under great pressure, due in part to the growing world population and climate change, but also because of how we currently produce and consume food. The Agri & Food sector has traditionally focused on production and efficiency, producing as much food per square meter as possible at the lowest possible cost and with a limited view of value creation. The predominant focus on productivity, the free market, and profit maximization has shifted social and ecological values and costs to the background. Profit is narrowly defined in monetary terms by externalizing ecological and social costs, which means these 'hidden costs' are usually not reflected in the price of food. A recent estimate puts the 'hidden costs' of global food and land-use systems at $12 trillion, which is 20% more than its market value of $10 trillion (Pharo et al. 2019). It is clear that current food production and consumption systems are no longer sustainable from a social, ecological and economic point of view.

The Dutch Province of South-Holland has risen to the challenge and adopted an ambitious transition approach in 2016 in order to realize more sustainable agricultural and food chains, offering healthy, sustainable and affordable food for everyone in the Province of South-Holland in five to ten years from now. Part of this ambition is to achieve a provincial level of 80% self-sufficiency in 2036, which is currently estimated at 40% (Nefs, 2017). That would save a lot of food miles and yields even fresher products. Moreover, it would strengthen the bond between farmers and citizens, while at the same time, increasing more citizen awareness on the production process itself. But above all, the ambition is to realize a more sustainable food system. In order to realize this ambition, the South-Holland Food Family (in Dutch: Zuid-Hollandse Voedselfamilie) was established as open innovation and food transition network, supported by the provincial government and many partners.

The Dutch Province of South-Holland, with 3.6 million inhabitants living on 3,403 km^2, is one of the world's most densely populated areas. It includes the country's second and third-largest cities Rotterdam, Europe's largest port, and The Hague. Remarkably, the province has a large agricultural sector, with arable farming, flower production, and livestock farming.

The world's largest contiguous greenhouse area is situated in this province. Most South-Holland food produce is exported. Hence, the ambition to become more self-sufficient, establish shorter food supply chains, and develop circular production and consumption systems, cannot be achieved through optimising the current food system.

A transition is needed: a fundamental change of the food system's structure, culture and practice. In its "Innovation Agenda for Sustainable Agriculture" (2016) the Province adopted an approach for change which is based on several converging conceptual frameworks. The Transition Management approach (Loorbach et al., 2017) assumes that change always starts to emerge in niches and generate agency when diverse initiatives connect and challenge the regime. Such processes can be guided. The Technological Innovation Systems approach (Hekkert & Ossebaard, 2010) focuses on 'innovation engines' formed by a diversity of actors, while the Energising Networks theory (Wielinga en Robijn, 2020) assumes that human structures are living tissue which behave according to basic organising principles in nature (Wielinga 2001). Every organism has an energy management system. By focussing on energy in human interaction it is possible to stimulate the emergence of 'vital space' where actors like to contribute and become co-creative, as was shown in a large scale experiment with 120 networks of livestock farmers (Wielinga et al, 2008). From this experiment the FAN approach emerged: (Free Actors in Networks). In 2012 this approach was introduced in the Province of South-Holland, where it was renamed as "Networked Working (*Netwerkend werken*)".

Internally, government workers call this combination the "change approach" and its main goal is to stimulate and facilitate experimentation, innovation and entrepreneurship within the food transition. It is the first time that such a transition approach is applied in this way within the Province. This approach is now also considered or (partly) for other major policy changes within the province, for instance for circular economy and the energy transition.

In organisational terms, the transition approach entails: 1) an open innovation and food transition network for food pioneers and change agents called the South-Holland Food Family (*Zuid-Hollandse Voedselfamilie*) supported by the provincial government and many partners; 2) a subsidy programme to support experimental projects/Living Labs for a sustainable food system, which has initiated an impressive portfolio of more than 30 Living Labs (*Proeftuinen*), where food pioneers and change makers explore what changes are possible, and 3) a research and development (R&D) programme to further develop and disseminate knowledge from the experimental projects, making use of reflexive monitoring, impact assessments and a dynamic learning agenda. This transition approach is funded by Province of South-Holland and by the European Innovation Partnership program (EIP), which has been stimulating thousands of local initiatives in Europe since 2014 to find new ways for sustainable agriculture. The Province of South-Holland is also making use of this scheme to finance Living Labs for the Food Family. The open innovation trajectory and transition path followed by the South-Holland Food Family is visualized in Figure 1.

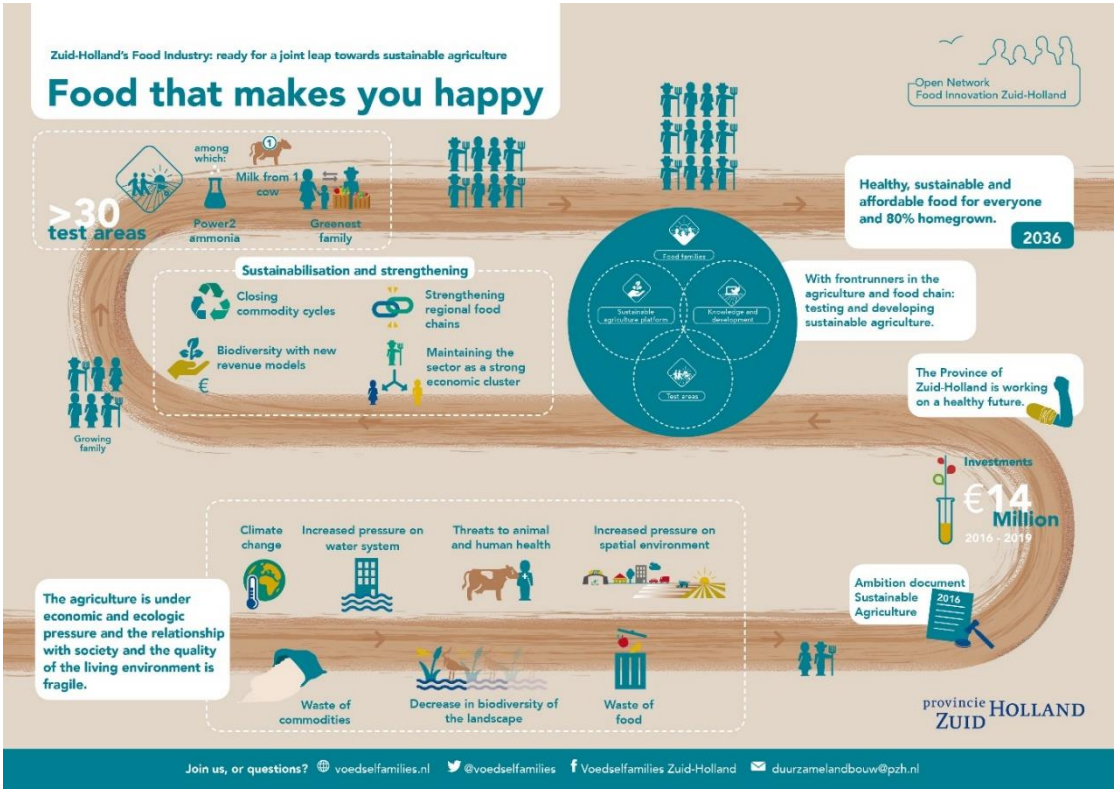

Figure 1 - Transition path of the South-Holland Food Family

This paper provides an institutional analysis of how the transition approach has been established and developed in practice, with specific attention for institutional change. The **main question** is what interventions and actions have shaped the transition approach and how does the dynamic interplay between actors and institutional structures influence institutional change, by analysing a series or cluster of related action situations (and their context), looking at 'structure' and 'agency', and at the output-outcomes-impact of these action situations. We take Calhoun's definition (2002) of institutions as 'deeply rooted patterns of social practices or norms that play an important role in how society is organized'. A distinction is made between formal institutions (those adopted through a formalized process, including the constitution, laws, and legislation) and informal institutions (those embedded in organizations or groups without a formalized process, including customary law, existing practices, norms, and culture).

Analytical framework for transformative social-ecological innovation (TSEI)

For our analysis we have used the Transformative Social-Ecological Innovation (TSEI)-framework (Huntjens, 2019; 2021), which was developed with the purpose of studying the dynamic interplay between actors and institutional structures influencing institutional change (see figure 2). Transformative Social-Ecological Innovation is defined as "systemic changes in established patterns of action and in structure, including formal and informal institutions and economies, that contribute to sustainability, health and justice in all social-

ecological systems" (Huntjens, 2021). The TSEI-framework presented here is based on earlier work by Huntjens et al (2016) and Huntjens (2019 & 2021). Predecessors of the TSEI-framework have been used successfully in environmental diplomacy, governance and mediation processes in various parts of the world (Huntjens et al., 2014a, 2014b; Huntjens, 2017a, 2017b; Yasuda et al., 2017a, 2017b, 2018), as well as in advancing transformation processes and institutional change in water management, agriculture and spatial planning (Islam & Madani, 2017; Huntjens, 2019).

Transformative social-ecological innovation (TSEI) "*requires collective action and effective cooperation between multiple parties, multiple sectors and multiple levels, as well as institutional change and new modes of governance that acknowledge the complexities of social-ecological systems. It will go hand in hand with processes of collective or transformational learning, in which different, but interdependent, parties learn from each other and develop new knowledge on social-ecological systems in a transdisciplinary approach. A shift from linear to circular business models, innovative forms of financing, such as revolving energy and sustainability funds, innovation funds, seed money, structural adjustment funds and other incentives are an essential part of this development in order to realize societal impact*." (cf. Huntjens, 2021). The process of TSEI boils down to engagement and participation of government, businesses, academia, civilians, civil society, media and the environment, in combination with multi-party deliberation and evidence-based decision-making, in what is known as the quintuple helix innovation model (Barth, 2011; Carayannis & Campbell, 2010). The quintuple helix shows how democracy and the environment need to be integrated in the wider perspective of the architecture of transformative social-ecological innovation and societal transformation.

The TSEI analytical framework takes the action situation as the object of analysis. Elinor Ostrom (2005, 32) refers to an action situation as the social space where participants with diverse preferences interact, exchange goods and services, solve problems, dominate one another, or fight (among the many things that individuals do in action arenas). The TSEI-framework by Huntjens (2021) considers the action situation as the interface or 'glue' between two important analytical components: structure/institutions on the one hand, and actor-agency on the other. This relates directly to one of the important debates in social science: the relationship between structure and agency. Anthony Giddens (1984) argues that social structure is both the medium and outcome of action. According to Giddens (1984) and Alexander Wendt (1987), actors have preferences which they cannot realize without collective action; based on these preferences they shape and re-shape social structures, albeit also through unintended consequences and over a longer period of time (cf. Grin 2010). Once these social structures are in place, they shape and re-shape the actors themselves and their preferences. In other words, the constitution of agents and structures are not two independent sets of phenomena, meaning that structures should not be treated as external to individuals. This is what Voß and Kemp (2005) call second-order reflexivity, which is about self-critical and self-conscious reflection on processes of modernity, particularly instrumental rationality. It evokes a sense of agency, intention and change. Here, actors reflect on and confront not only the self-induced problems of modernity, but also the

approaches, structures and systems that reproduce them (Stirling 2006; Grin et al. 2004). In other words, actors have the ability (agency) to evaluate the effectiveness of their actions in achieving their objectives. This means that if actors can reproduce structure through action, they can also transform it.

The TSEI-framework helps to diagnose transformative social-ecological innovation across sectors and disciplines, and at different levels of governance. To this end, it identifies intervention points and helps to formulate sustainable solutions that can include different views, as well changing and competing needs. Overall, the concept of transformative social-ecological innovation opens up new possibilities for unpacking the longstanding challenge of understanding institutional change within the governance of sustainability (Huntjens, 2021).

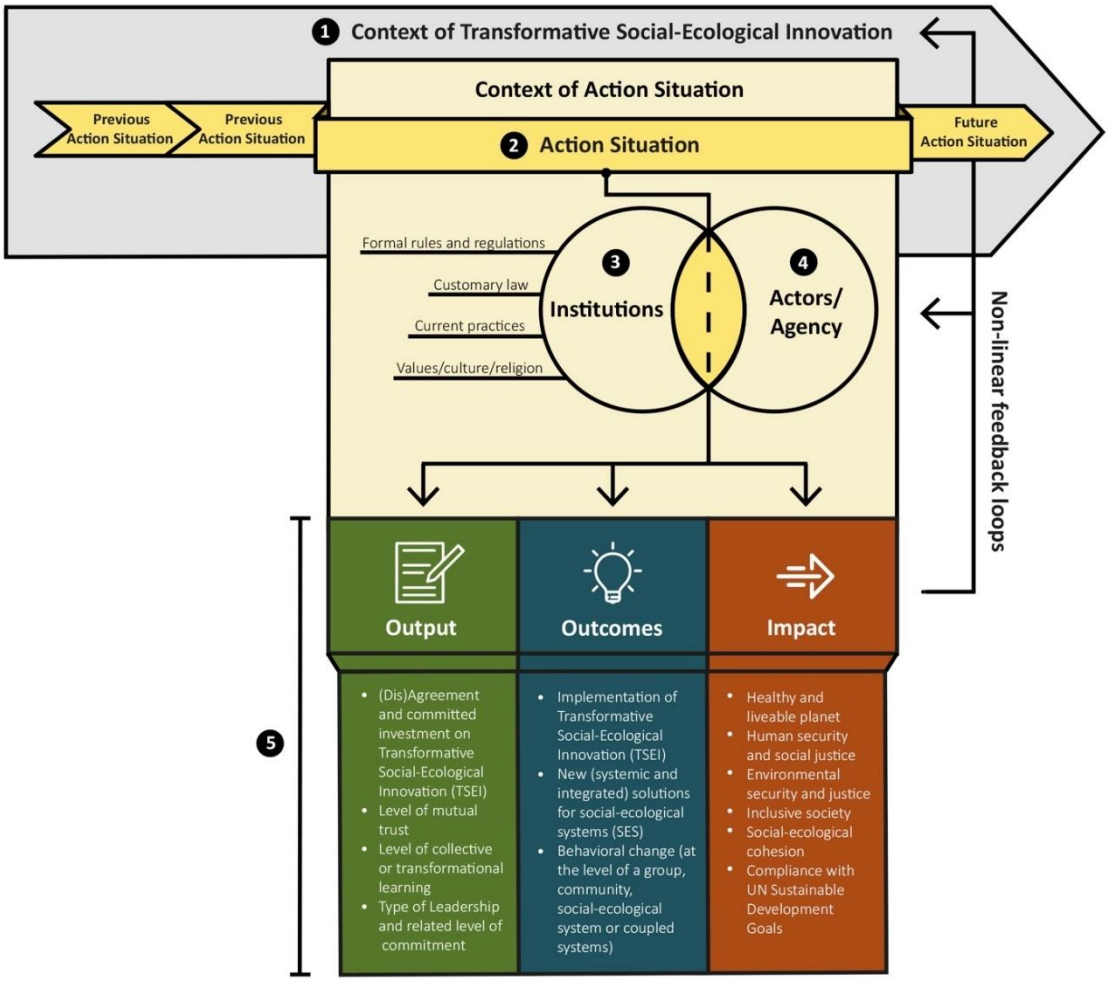

Figure 2 – TSEI analytical framework (Huntjens, 2021). The numbers of the analytical components in below 'results' section correspond with the numbers in figure 2.

Methods

The TSEI-analytical framework was used to zoom in on a series or cluster of related action situations (and their context), looking at 'structure' and 'agency', and at the output-outcomes-impact of these action situations (per situation where possible and per series /

cluster). A series or cluster of related action situations is referred to as an action arena or transition arena.

For identifying important action situations, the "Energy Time Line Method" was applied. In a group session, key actors who had been involved in the development of the Food Family programme were asked individually to recall moments that mattered to them: moments that gave them energy, moments that took energy, and moments where new insights or opportunities broke through. By reflecting on the timeline on which these moments were collected, eight action situations emerged as particularly interesting for further analysis.

This version of the time line method was first described as part of the FAN approach (Wielinga et al. 2008). It builds on the Critical Incident Technique (Flannagan 1954) and the Learning History Method (Kleiner and Roth 1997). In contrast to many other methods for monitoring and evaluation, performance is not compared to any kind of yardstick, but registered as facts that actors involved consider themselves as relevant. A learning history distinguishes the narrative story from the analysis. The story includes all facts brought forward by actors involved as important. In the analysis the expert applies methods and theory to deepen the understanding of these facts. In the case of the Food Family programme the authors used the TSEI framework for doing so.

The timeline method is thus part of the methodology of the TSEI framework. A total of eleven action situations were selected in which we could observe an informal or formal steering of the process (see table 1), based on empirical data from a series of eight individual interviews with participants of these actions situations, and based on joint reflection on the process during a timeline session with multiple participants.

The informal and formal steering and related institutional change that was observed differs per action situation, but usually involves a situation where multiple parties (with different interests, perspectives and preferences) come together and are confronted with a series of potential actions, where these parties exchange goods and services, try to solve problems, influence each other, learn from each other, and resulting in shared output / outcomes.

The TSEI-framework distinguishes five main components, corresponding to the numbers in figure 2:

1. TSEI context and action situation-specific context
2. Action situation
3. Structure / institutions
4. Actors / agency
5. Outputs, outcomes and impacts

Each component will be described in below 'results' section. The selected action situations are then analysed, focusing in particular on subcomponents such as initiation, process, format and content of the action situation. Detailed questions regarding these subcomponents are listed in table 1, based on Huntjens et al. (2016; 2017) and Huntjens (2019, 2021).

Table 1 - Subcomponents and questions for the analysis of the action situation (Huntjens, 2021)

Subcomponent	Question
Initiation	• What triggered the meeting? • What was the objective? • Who organized it? Who was invited, who was not, and why? • How was support mobilized?
Process/Format	• Who was present and who cancelled? • Were there any specific reasons for participating or cancelling? • Which venue was used and how was the meeting structured (agenda)? • Who acted as a facilitator? How was inter-participant exchange facilitated? • Which discussion format was used, e.g. round-table discussion, a workshop, or a more advanced participation method? • Who spoke and who took minutes? • Was there any expectation management and was the decision-making process transparent? • Which decision-making protocol was used, e.g. majority vote, consensus, consent? • Which negotiation strategies were used, e.g. accepting the first offer, compromising (splitting the difference), competition (zero-sum game), or problem-solving (mutual profit)?
Content	• Which issues and topics were addressed during the action situation? Which were excluded or avoided? • What information was made available to participants in advance? Was it relevant? Was there enough time to take in this information? • Which uncertainties were identified and/or addressed in the action situation? • Did participants allow their knowledge and information to be challenged by other participants and did they present their own mental models, insofar as they were aware of them? • Was information presented in an authoritative way or a facilitating way, encouraging other participants to reflect? • Did new information emerge during the action situation, and how did this affect the negotiations or dialogue?
Output	• Agreements and related level of commitment, mutual trust, level of collective or transformational learning. For more information, see component 5.

Results

Component 1: TSEI context

Understanding the circumstances that influence the nature of the transformative social-ecological innovation in question and the context that may affect decisive moments in the cooperation process (the action situation) is an important first step in the analysis. Examples of contextual factors include the nature and extent of societal transformation, the history of cooperation between the parties involved in past action situations (or the lack thereof) and the key biophysical, material and socio-economic features of the area in question, such as a district or province.

We will illustrate this with a brief description of relevant characteristics for the province of South-Holland (Province of South-Holland, 2019):

- 3.6 million inhabitants living on 3,403 km2, which makes it one of the most populous and industrialised areas in the world.
- It includes both Rotterdam, Europe's largest port, and The Hague, the country's second and third-largest cities.
- It contains a large agricultural sector, with arable farming, flower production, and livestock farming and the world's largest contiguous greenhouse area.
- 45% of the 29,000 Dutch horticultural companies are based in South-Holland, with a production value of almost 4.5 billion euros per year.
- Provincial policy is to realize a more sustainable and self-sufficient food system.
- The provincial level of self-sufficiency in food produce is currently approximately 40%, and the policy ambition is to increase it to 80% in 2036.
- There is an abundance of niche players and innovations in the agri-food sector that align with the Provincial policy.
- Currently only 9% of the use of goods is circular. A transition to a circular economy is estimated to be able to offer around 10,000 jobs in the longer term.

Component 2: Action situations

An action situation is a situation in which two or more individuals are confronted with a series of potential actions that will result in shared outputs and outcomes (Ostrom 1999, volume 42; 2005, p. 13). For our analysis we identified and selected action situations which were decisive for the process of cooperation and/or its outcome. This may range from informal meetings, such as network or multi-stakeholder dialogues, to more formal meetings within a negotiation or decision-making process, often as part of a series or cluster of closely related meetings or negotiations. It is often necessary to study several different action situations, as well as their relationship to each other, in order to gain a better understanding of the TSEI-process.

Table 2 provides an overview of such a cluster of closely related action situations during the initiation and development of the transition approach for Sustainable Agriculture in South-Holland. This overview provides a brief description of the nature of these action situations and the formal or informal institutional change that occurred. This will be followed by a closer look at two decisive action situations (no. 1 & 2 in below overview).

Table 2 - TSEI-framework application: Timeline of a series of closely related action situations where institutional change occurred, during the initiation and development (2015-2018) of an open innovation and food transition network called The South-Holland Food Family

	Name and date of action situation	**Type of formal or informal institutional change that occurred**
1	**24-hour team creation meeting on October 8 & 9, 2015 in Oost-Knollendam (NL)**	This meeting introduced the open innovation network approach to various stakeholders (including Province) in the South-Holland agricultural sector, and formed the basis for further network meetings. Using the TSEI-framework we can observe some clear examples of process steering in this action situation: First, there is a deliberate choice to use the multi-level perspective (MLP) from Transition Management theory, and as a result, to search for frontrunners instead of established or 'regime-confirming' parties. Also, the Free Actor in Networks (FAN) approach was used as a reference for (informal)

		network formation. From the agency side: the interviews show that the informal setting played an important role in distancing the civil servants from their official role, and also for other attendees, to be able to speak freely about the food system (opportunities, obstacles and ambitions) and find their own role. The central question was: who wants what, who can do what and who has influence? This formed an important basis for the network (yet to be established) and also for determining the transition agenda. Outputs: 1) "The book of ideas – Baseline for more sustainable agriculture"; 2) A joint problem definition & way of solution thinking; 3) Concrete plans for further steps: interviews with front runners; energy among participants. Relatively fast follow-up also gave participants confidence that it might work this time. Subsequently, interviews were held with potential frontrunners to warm up and reach involvement for the Kick-off meeting (see next row). These frontrunners were approached, again on the basis of 3 questions (who can do what, who wants what and who has influence), they were also able to indicate their dream for a sustainable food system in advance. Video recordings were also made of this.
2	**Kick-off meeting at Duijvestijn, entitled "Who is following the fool?" on January 14, 2016 in Pijnacker (NL)**	The network comes together for the first time, and could be considered as the first "official" arena session. The structure-agency dynamics can be observed very nicely in this action situation. For instance, various forms of stakeholder management and process facilitation took place: 1) The Province has given a 'go ahead' to set up an innovation platform, with an active role and commitment of the business community. The first meeting (the kick-off) was therefore at Duijvestijn's company, one of largest growers of tomatoes in the Netherlands. This venue marked a clear departure from a traditional policy approach, even more than the first meeting in Oost-Knollendam; 2) The presence of the Provincial Minister (Han Weber) is an example of latent or implicit power from a TSEI perspective: so power is not used explicitly, but others do take into account the power that can be (or will be) exercised; 3) Management by objectives (such as working towards the first progress report) and more general agreements; 4) Process steering by interactive games and related game rules, with the aim to create energy. Everyone was invited to play, a lot of innovators were invited and interviews were held to bring their ideas. In short, it was deliberately set up as an open network, so anyone who was interested could join and was invited to contribute. From a TSEI perspective this meeting is relevant since it continued the transition management approach by verifying and elaborating the initial problem analyses (multi-level analysis) with the broader network of interviewees.
3	**Network meeting at Blue City on 28 January 2016 in Rotterdam (NL)**	Second network meeting. During this meeting the term 'Food Families' was created, which was considered an important moment by a number of those involved. The choice of name and elaboration is a form of process steering, because the network initiators aim for a family feeling, where the members feel connected to each other. And that is what the initiators want in the food chain. Ideas are sought that give energy.
4	**Network meeting at Arnout den Ouden on 10 march 2016**	Third network meeting, with further development and exchanges of opinions, facts and dreams. Here, the ambition and goals of the Transition Agenda were further elaborated. At the arable farm, it was also possible to experience and see how the soil conditions and fertility were affected by more traditional forms of agriculture and why the partnership den Ouden wanted to improve this.

5	**Network meeting at Corné van Leeuwen on April 21, 2016**	An early version of the Transition Agenda is shared and the first progress report is almost completed. During this meeting three farmers take centre stage and visions of the future are formulated. Everyone realizes: it starts with them.
6	**Food family breakfast at the Province of South-Holland on May 18, 2016**	Results of earlier network meetings are presented in the form of a transition agenda, as part of the 1st progress report. Three possible transition paths are presented here. This meeting was instrumental for the final adoption of the Ambition document on the Innovation Agenda for Sustainable Agriculture by the Provincial Council of Zuid-Holland on 26 May 2016, including the allocation of funding for the innovation network, subsidized pilot projects (>30), and a knowledge team. In the meeting of 18 May, provincial decision-making and politics had a central place, which is a prime example of where the formal decision-making process (by Province) and the informal decision-making process (by innovation network) coincide.
7	**Several network meetings; fall 2016 - spring 2017**	Between June 2016 and May 2017, several Food Family meetings were held on various topics such as the first opening of the subsidy scheme for Living Labs for Sustainable Agriculture, meetings to realize further cooperation in the food supply chain and between partners to submit Living Lab proposals and further elaboration of future visions. To support potential partnerships, the province offered initiators a broker to help the initiator set up a new alliance, tighten up and improve their Living Lab proposal or shape the initiative in another way or to stop.
8	**Collaboration agreement 'Learning by Doing', December 2016**	In 2016, a collaboration agreement (for a period of four years) was signed between several education and research institutes and the province, with the aim to collect and share knowledge from the experimental projects/Living Labs, making use of reflexive monitoring, impact assessments and a dynamic learning agenda.
9	**Food innovators party at Koppert-Cress on 11 May 2017 in Monster (NL)**	A large gathering of the network that made the Food Families visible and created a lot of energy in the network. During this meeting the 1st round of subsidized pilot projects was launched. There were workshops, inspiration sessions and various ideas were presented and linked again, leading to a tightening of the agenda (output) and consolidation of the network (output). Presentation of 2nd Progress Report; update and adaptation of the 1st. This was presented by the members of the Program Council to the Provincial Minister Han Weber. Progress report was also distributed (total of about 1000 copies).
10	**Taste makers meeting on 18 & 19 September 2018**	After two years of Food Family, it was time for an evaluation, and that question was put out by the Province in the form of a two-day multi-stakeholder meeting and interviews and aimed to gauge the state of the energy in the network and contributed to the feeling of energy in the network. Output: the report "Taste makers thermometer" (2018)
11	**Harvest Day on October 18, 2018**	The Harvest Day was a major event, generated energy and opened a "window of opportunity" to continue. In parallel workshops, current problems in the pilot projects were tackled, of which relevant examples for the TSEI analytical component structure/institutions included the bureaucracy around POP3 (subsidy) processes, and legislation and regulations that appeared to block short supply chain (SSC) projects.

		Output: During the Harvest Day, it was determined what is needed to be able to continue in South-Holland and a campaign plan 'Manifesto of the Food Families' was handed over to provincial and national decision-makers. This is another example of where the formal decision-making process (by Province) and the informal decision-making process (by innovation network) coincide.

Action situation 1: Network Formation, 24-hours session in Oost-Knollendam (Oct 2015)

From 8 to 9 October 2015, a very first meeting took place in the village of Oost-Knollendam. A total of twelve provincial policy makers attended the meeting, as well as representative of LTO-Noord (The Dutch Agriculture and Horticulture Association-North) and a transition researcher (one of the co-authors of this paper). The meeting had a 24-hour set-up, roughly from 12:00 to 12:00 hrs, with a sleepover at the venue.

This initial meeting included several group exercises. The most important ones were a multi-level analysis of the South-Holland agri-food system, using the multi-level perspective on transitions by Geels (2002) and Geels & Schot (2007), and an actor analysis of front-runners (basically: free actors, that is; innovators, critical thinkers, etc.) in the South-Holland agri-food system, as a basis for starting an innovation network. In so doing, this initial meeting clearly included aspects from both the transitions approach and the FAN approach, which were brought together by the facilitator Pepik Henneman, based on the approach described in *Burgermeesterboek* (Henneman et al., 2012). The meeting concluded with a selection of potential members of the innovation network.

Over the subsequent months, the initial meeting participants went out in dyads to approach the potential network members by inviting them for an interview about sustainability of the South-Holland. Interviews were held using only one question: "Whom are you feeding and who's feeding you?" The interviews did help to verify the multi-level analysis from the initial meeting a bit, but, more importantly, and in line with the FAN approach (Wielinga et al., 2008, 2020), they were intended to consult with potential network members, to get an impression of their potential motivation to be part of the innovation network, and to fan their enthusiasm for agri-food transition. Interviewees were invited for a first network meeting (in transition management-parlance: the first *transition arena* meeting).

Action situation 2: First official arena session of the Food Family, Pijnacker (Sept 2016)

The first "official" arena session is of interest for two reasons. First, it continued the transition management approach by verifying and elaborating the initial problem analyses (multi-level analysis) with the broader network of interviewees. Second, its venue marked a clear departure from a traditional policy approach, even more than the first meeting in Oost-Knollendam.

At the time of the meeting, the policy domain of agriculture was divided across two different provincial government departments. Most of the agriculture sector was part of the department of Agriculture, but the greenhouse sector was part of the department of Economic Affairs. The policy programme for sustainable agriculture was guided from the department of Agriculture. However, the networking / transition approach did not keep to the somewhat arbitrary boundaries between different parts of the administration. Instead, right from the beginning, one greenhouse grower took a quite active role in the network and ended up hosting the first meeting, which, as it were, took place at a venue outside the jurisdiction of the Provincial department of Agriculture.

Also relevant was the participation of the provincial minister for agriculture. Not only he showed his commitment to the programme this way, but he also participated as an interested listener. From a FAN approach perspective, it can be seen as an achievement that also the responsible minister took a position of a partner for making things possible together, rather than as an authority.

Two realities: Food Families vs. Policy Programme

A series of subsequent meetings was organised, with more and more people getting involved. This process – both the facilitation and the venues – were funded by the government, but the agenda was decided very openly and collaboratively with the network members. The meetings were used to reaffirm and elaborate on the multi-level analysis, and they were also used to support the emergence of several future images and transition pathways. In that regard, the process mimicked the steps that transition management processes feature – from problem analysis to transition challenge, to future exploration and then to back-casting (transition pathways). Over the course of these meetings, also the name of the emerging innovation network was chosen: The South-Holland Food Families, based on the idea that everybody is connected via food networks in one big family.

In the meantime, however, there also was the policy process to attend to. In the terms of the government and the administration representative, there was a policy programme called “The Innovation Agenda Sustainable Agriculture.” And while it professed various ideas about innovation systems and was influenced by transition thinking, it also showed several conventional policy-making characteristics, in the sense that it had been approved by the provincial parliament, and by setting politically motivated goals, and in the sense that it included a series of subsidy programmes with all the associated juridical formalities: writing proposals, co-financing, a review board and a set of selection criteria that was often not directly related to the rationale of the South-Holland Food Family, but aligned with administrative law. Nevertheless, for the provincial government the transition approach was a clear deviation from the traditional approach. It ensured that there were no clearly defined goals, no classic project management and planning, but instead created space for adaptive management during the process. The latter provoked quite some discussion in the Provincial Parliament, but the Provincial Minister eventually succeeded in getting this approach approved. The network approach, with specific attention for support and guidance for the members of the Food Family, in combination with a subsidy programme tailored to the needs of the Food Family and (partly) open-ended Living Labs, resulted in a unique approach that served as an example for other provinces in the Netherlands.

The situation can be seen as one of two parallel worlds, the ‘warm network’ of the Food Family and the ‘cold network’ of the official structure. In the Food Family world, a situation had emerged where three different future images acted as implicit goals for innovation. They were called “Window-sill Agriculture”, based on the idea of food sheds (vs. water sheds) and local-for-local production; “Waterpark”, based on the idea that in the future it might be impossible to keep water out of the South-Holland peat meadows, and “MegaMakerMovement”, based on the idea that in the future, a lot of food processing would be done by small scale food makers, and not international companies like Nestle or Unilever.

The official policy agenda, in contrast, spoke of policy goals such as circularity, and project proposals that had to explain how they would contribute to these policy goals. Furthermore, from a transition management perspective, it would have been logical to find innovative agricultural entrepreneurs from the SHFF and fund their projects. However, the subsidy programme, in conformance with EU subsidy rules, was open to the general public.

The provincial policy makers in charge took various measures to connect these two parallel worlds. First of all, in keeping with the FAN approach, an unusual amount of funding was reserved for collaboration projects – projects that fostered their innovative power through building new collective businesses. Second, the SHFF network was informed and supported to form coalitions and write project proposals. In this way, the government did all it could – within legal boundaries – to ensure access to innovation funding for the SHFF. This approach resulted in a rich range of projects, some of which were more traditional (aimed at regime optimalisation) and others that clearly fitted with the various transition pathways. Indeed, one the projects funded was titled "Waterpark".

Component 3: Institutions

The concept of 'institutions' has several different interpretations in literature. This paper follows the definition proposed by Calhoun (2002, p.33): "Institutions are deeply rooted patterns of social practices or norms that play an important role in how society is organised." Institutions can pertain to various areas of social activity, such as family life, associations and politics. Generally speaking, institutions result from a process of institutionalisation, in which preferences are gradually strengthened until they are fixed and familiar. This process is usually accompanied by conflicts and the exercise of social power (Parker et al. 2003). We distinguish between formal and informal institutions:

- formal institutions are those that structure the practices of actors and which are adopted through a formalised process. They include the constitution, laws and legislation adopted by society, organisations, and policy.
- Informal institutions are those that structure the practices of actors and which are embedded in organisations or groups without a formalised process. They include customary law, existing practices, norms, and culture.

To illustrate a process of institutionalization we highlight the decision-making process leading to the final adoption of the Ambition document on the Innovation Agenda for Sustainable Agriculture by the Provincial Council of Zuid-Holland on 29 June 2016. Although the adoption did indeed conclude a decision-making process with regard to ambitions and the agenda, it mainly constituted an important step within a longer-term process of change towards a strong, sustainable and future-proof agriculture and food chain in the Province of Zuid-Holland. With the adoption of the Ambition document, the Province made seven million euros in co-financing available from the Rural Development Programme (*Plattelands Ontwikkelings Programma*), in addition to seven million euros from the EU/EIP programme (European Innovation Partnerships) which stimulates bottom up initiatives for innovations in agriculture and rural development, adding up to a total of 14 million euros in available funds. Entrepreneurs can use this funding to implement innovations in experimental projects to drive sustainable agriculture. In addition, 350,000 euros of co-funding were set aside for the 'Knowledge and Development Programme', an initiative by various educational institutions and universities to collect and share knowledge. To facilitate the approach to change and network building, approximately 650,000 euros have been made available for a period of 4 years.

Component 4: Actor / agency

Agency refers to an actor's ability to exert influence (Ali-Khan & Mulvihill 2008; Newman & Dale 2005). The first step in analysing this component consists of identifying key stakeholders and actors, with the former referring to all persons, groups, and organisations with an interest in the societal change in question, either because they are affected or because they can influence its outcome. This includes individual citizens and businesses, interest groups, government agencies and experts. It is important to map the interests, incentives, and access to financial, personal or institutional resources

of all stakeholders who participate actively in the action situation. On top of that, existing coalitions and partnerships are also important. In order to better understand cooperation and decision-making, it will often be necessary to identify the preferred negotiation and influence strategies of each actor, as this information, when bundled, will provide greater insight into the role and influence of each individual actor.

Especially the first phases of the South-Holland Food Family clearly exhibit the characteristics of transition management (Loorbach et al., 2018). The province sought help from Pepik Henneman, a consultant with theoretical knowledge of and practical experience with transition management, following an approach described in *Burgermeesterboek*[2] (Henneman et al., 2012). He guided the SHFF through a problem analysis using Geels' (2002) multi-level perspective and supported the initial growth of the SHFF as an innovation network by having policy makers interview innovators across the food system – farmers, traders, environmental / nature organisations, knowledge institutions.

In this early stage of network formation, the approach in practice also exhibited many characteristics inherent in Wielinga's work about the Free Actors in Networks (FAN) approach (Wielinga et al., 2008). That is, the formation of the network was practically approached as an *intervention* that combines both institutional and personal elements: the warm and the cold network.

As of 2019 the South-Holland Food Family and its open innovation network (see figure 3) consists of around 650 people from the agri-food sector. In this network the following groups are important for implementation:

- Programme Council: 9 people from the agri-food sector who are responsible for programming and implementing activities for "South-Holland Food Families" in collaboration with the Knowledge Team, the province and the experimental projects. The board members of the South-Holland Food Family Foundation are on the Program Council.
- Knowledge team: As part of the Knowledge and Development Program the so-called 'Knowledge Team' plays an important role in terms of knowledge development, sharing and dissemination. The team includes representatives from the Province of South-Holland, Wageningen Economic Research, InHolland University of Applied Sciences, HAS University of Applied Sciences, DRIFT / Erasmus University, and the Ministry of Economic Affairs & Climate.
- Experimental projects / Living Labs, supported by a subsidy program, which currently constitutes a portfolio of more than 30 experimental projects (*Proeftuinen*), where food pioneers and change makers from the agri-food sector explore what changes are possible.

[2] 'Burger' means citizen, 'meester' is master. But 'burgemeester' means mayor. A playful book title.

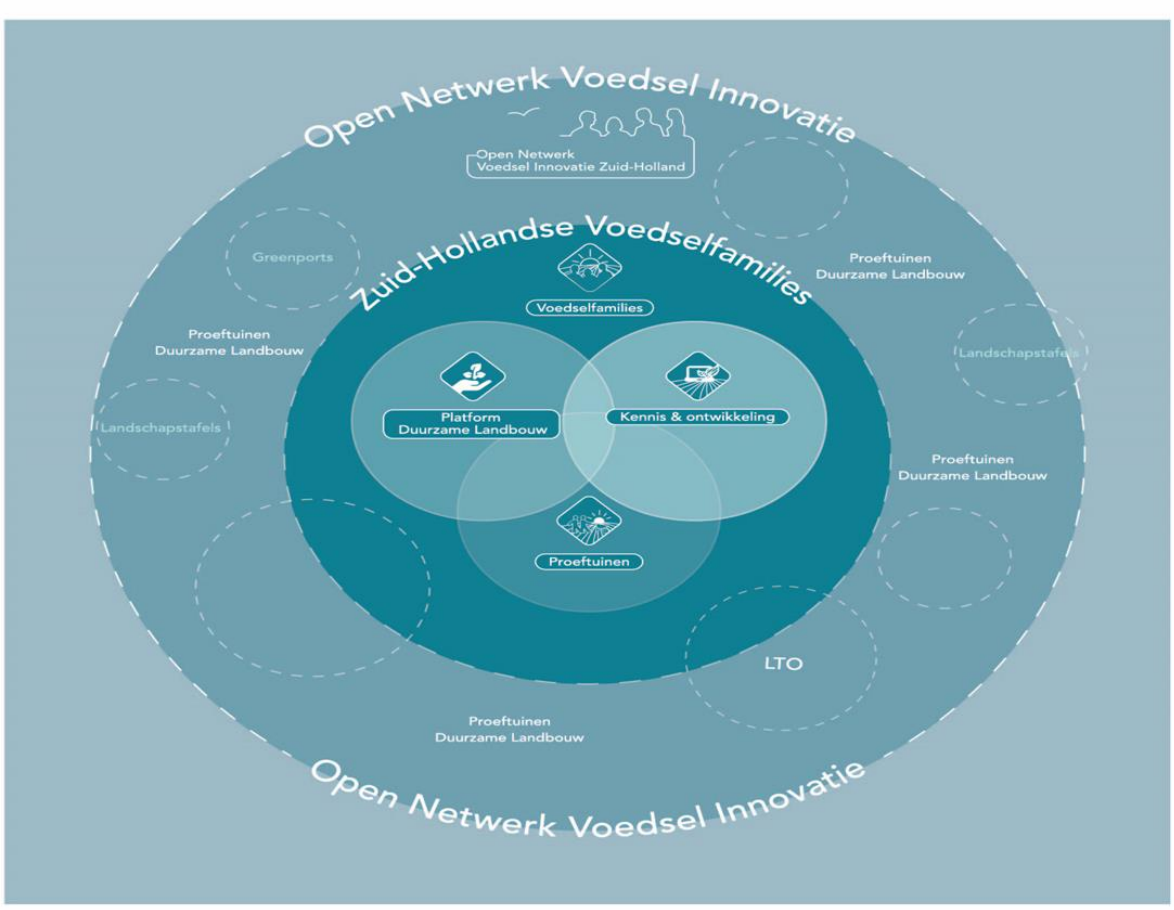

Figure 3 – South-Holland Food Family and its open innovation network (English translation will follow soon)

Component 5: Outputs, outcomes and impacts

An action situation can result in outputs, outcomes and impacts, three distinct concepts. The difference between these three is defined as follows (Huntjens, 2019 & 2021):

- **Output**: the product resulting from one action situation or output of series or clusters of closely related action situations. Examples of output include a cooperation treaty, other types of agreement, committed investment, a plan, strategy, legislative proposal, financial regulations or instruments to promote sustainability. Also, the level of collective or transformational learning (see section 5.3), mutual trust, type of leadership and related level of commitment are considered as outputs.
- **Outcome/result**: this is the direct effect of the output. It is measurable and time-limited, though determining the full effect can take an extended period of time. Examples of outcomes include behavioural change, new knowledge and solutions resulting from co-creation and social learning. A new revenue scheme for sustainable business or a circular business model could be outcomes of (new) financial regulations and instruments that promote sustainability.
- **Impacts**: these are the long-term or indirect effects of the outcomes/results.

Impacts are often difficult to quantify because they are hard to attribute only to the intervention, while many other influence may count as well. Impact is what we hope for, whereas results are what we work for. To illustrate the difference between results and impact: In sustainable business

practices aimed at nature-inclusive agriculture, farmers work to make a living (result), and with biodiversity measures (also result) they hope for the restoration of biodiversity (impact). It is also important to consider unintended side effects, as it is possible for policy to achieve its intended goals while also leading to a large number of adverse side effects (Biermann et al. 2007). The introduction of phosphate rights in The Netherlands, for instance, had unintended negative side effects, such as the irresponsible increase in milk production per cow and the significant growth of dairy farms without using extra land.

As an important output of the transition approach SHFF we analysed the level of collective or transformational learning that has occurred during the process, covering action situations 1-11. In table 3.

Table 3 – Assessment of the level of policy learning that occurred during the process of the transition approach South-Holland Food Family

Type	Indicators	Examples from SHFF transition approach
Single loop learning	1. Small changes are made to specific practices or behaviours, based on what has or has not worked in the past. Things are done better without necessarily examining or challenging underlying beliefs and assumptions (Kahane, 2004). Goals, values, plans and rules are operationalized rather than questioned (Argyris and Schön 1974)	In case of single loop learning or optimization of existing practices the experimental projects / Living Labs would not have been funded.
	2. Goals, values, frameworks and, to a significant extent, strategies are taken for granted. The emphasis is on techniques and making techniques more efficient (Usher and Bryant 1989, 87).	Overall, goals, values and framework are not taken for granted, but challenged
Double loop learning	1. Modifications (as the result of learning) are occurring, or have occurred, in personnel, programs, and legal and organizational structures that incorporate new information (including policy feedback) and causal understandings that yield more intellectually perceptive processes, a wider range of capabilities, and more effective policy (Brown 2000, 3).	An explicit requirement for the 30 subsidized experimental projects/Living Labs is to collectively work on innovation. Examples of such innovations can be found in the digital magazine 'Making things that make you happy' (June 2019) : https://magazine.voedselfamilies.nl/november2019/eten-maken-waar-je-blij-van-wordt/ For example, see projects Rotterzwam, Graanwaard, Krekerij, Jopy Bugs, Goedewaar, Hoeksche Waard Rond, Elke Melk, etc.

	2. Actor networks are changed by including new stakeholders, supporting reflection on assumptions, and showing new possibilities. The social network of stakeholders is seen as the basis for learning and dealing with change (Folke et al. 2005; Geels, Elzen, and Green 2004).	- Food Family meetings around images of the future - Knowledge team - Food Family Academy (recent) So far, the focus has been on the public sector (province, municipalities and knowledge institutes) and private sector (SME, and farmers and food pioneers in particular), and less on the plural sector, including civil society organisations, cooperatives, foundations, and citizen initiatives. This could be better balanced in the future.
	3. Uncertainties are identified as a first step to find solutions (Brugnach et al. 2008), and then taken into account in policymaking (Huntjens et al. 2010).	Publication: 'This is how the future tastes' Expertmeeting on juridical hurdles for experimental gardens in sustainable agriculture (Nov 2019)
Triple loop learning	1. Horizons of possibility are expanded (Hargrove 2002, 118).	The South-Holland Food Family includes an impressive portfolio of more than 30 subsidized experimental projects/Living Labs (*Proeftuinen*), where food pioneers and change makers explore what changes are possible, and how obstacles can be overcome.
	2. A paradigm shift takes place that alters our way of thinking and behavior (Hargrove 2002,119, Pahl-Wostl 2007).	The transition approach is fundamentally different from the traditional approach to policy development and implementation that had hitherto been implemented by the Province. This approach is now also adopted (in part or in full) for other major policy changes within the province, for instance for circular economy and the energy transition.
	3. A major structural change takes place in the regulatory framework	Adoption of the Ambition document on the Innovation Agenda for Sustainable Agriculture by the Provincial Council of Zuid-Holland on 26 May 2016, including the allocation of funding for the innovation network, subsidized pilot projects (>30), and a R&D team.

In addition, the transition approach so far has resulted a number of more tangible outputs and outcomes (not exhaustive):

- Establishment of the Programme Council (2016).
- Establishment of the Knowledge Team (2016).
- Start-up of 30 experimental projects in 2016-2017, and 8 new ones in the course of 2019-2020. The projects are working on a wide variety of topics, such as sustainable and sufficient income for farmers, better position in the food chain through new short chains, closing cycles in company and between companies, sustainable digital marketplace; reward sustainability and ensure sales, soil improvement, subsidence issues, food waste, closer connection/chain between farmers and consumers, new financing and business models, new forms of land ownership, and dissemination of knowledge.
- The Knowledge Team has collected and shared knowledge from the experimental projects, making use of reflexive monitoring, impact assessments and a dynamic learning agenda. Mobilization of resources takes place because all participating parties contribute knowledge, students, and humanpower. In addition, the team organizes and facilitates once a year a

South-Holland Agricultural Ambition Day. On this day, participating entrepreneurs, knowledge institutes and other parties share their latest experiences and insights from the experimental project with interested others (entrepreneurs, researchers, media, governments).

- Knowledge Team publication: Lessons from the Experimental Projects: The Future Tastes Like This (2019).
- Ambition Day 2017 and 2019.
- Food Innovators party 2017 - new initiatives.
- Various Food family gatherings, 2016, 2017 , 2018, 2019 en 2020 (ongoing).
- Establishment of three Transition Scenarios (*Toekomstbeelden*).
- Harvest Day 2018, including Manifesto for the future (2018).
- Report 'Making food that makes you happy' (*Eten maken waar je blij van wordt)* (2017)
- Digital magazine: Eten maken waar je blij van wordt" (June 2019)
- Three study visits to Spain (2x) and United Kingdom (1x) in the period Sept-Oct 2019)
- Collaboration with other Dutch food transition networks 'Transition Coalition Food (*Transitiecoalitie Voedsel)* and 'Participation Round Table Food Transition' (*Participatietafel Voedseltransitie).*

Discussion

The discussion on structure-agency relationships has consequences for the interpretation of institutional change as put forward by many institutionalists. 'Although institutions may have a level of permanency, in our analysis of action situations the institutions are sustained or altered by the actions of the people that reproduce or change them' (cf. Huntjens et al., 2016). It is exactly at this juncture (i.e. in the action situation) that institutions are 'renegotiated' and changed. When individual behaviour diverges from stated norms, structures will be renegotiated and may change. The duality of structure applies here: social structures determine and constrain social action on the one hand, but are reproduced, renegotiated, or changed by that same human action simultaneously (Giddens 1984). Thus, institutional change is not a process by design, but by institutionalization. The process of institutionalization is referred to as follows: "[Institutions] are the outcome of a process of institutionalization, whereby preferred ways of doing things are progressively reinforced, making them relatively reliable. This process usually involves conflict and the exercise of social power" (Parker et al. 2003, 212). In this vein, Giddens' (1984) structuration theory, as well as the work of Bourdieu (1988, 2005) and Seo & Creed (2002), provide compelling arguments for depicting institutions not only as constraints on action, but also as the objects of constant maintenance or moderation.

The example of TSEI-framework application provided here shows when and how local agents change the institutional context itself, which provides relevant insights on institutional work (Beunen & Patterson, 2019) and the mutually constitutive nature of structure and agency (e.g. Giddens, 1984; Bourdieu, 1988, 2005; Seo & Creed, 2002). Above institutional analysis also shows the pivotal role of agency, including network facilitators and provincial minister, and their capability and skills to combine formal and informal institutional environments and logics and mobilize resources, thereby legitimizing and supporting the change effort. The results are indicative of the importance of institutional structures as both facilitating (i.e., the province's policies) and limiting (e.g. land ownership) transition dynamics. Interestingly, while the provincial government holds some power over such institutions, it also has to operate in wider national and EU- institutional settings that are beyond its direct influence. This changes the role of the province. Where it started out as an "enlightened incumbent" with an innovation programme, it now is slowly taking on a more

"pioneering" role in its wider institutional environment. Hence, the transition policies reflexively have changed the province's role and identity.

Besides the institutional change that was observed, we have also identified several institutional structures that were considered by interviewees as obstacles or limiting factors that influenced the transition path so far. Some of these institutional barriers are more related to formal institutions, such as property rights, land ownership or legal barriers related to circularity, or more to informal institutions, such as limited multiple value creation between interdependent parties, or difficulties in moving from linear to circular business models, or related to difficulties in realizing True Cost Pricing, which is often related to complexities in measuring sustainability or translating sustainability measures in the cost price of products and services. Overall, we have identified four institutional barriers or challenges that (may) hinder further transition, and that need to be addressed in the next stages of the South-Holland Food Family:

- ***Land ownership, user rights and commons:*** Land ownership and current practices of selling land to the highest bidder are an important limiting factor for food pioneers, and other forms of land ownership, such as public commons, can help to make agriculture more sustainable. However, this would raise fundamental and systemic questions to the current regime of private property and land ownership: What if agricultural land would fall under user rights and public commons instead of property rights, as to avoid land speculation and selling land to the highest bidder only? What if business capital is not personal property but falls under co-management, also to avoid excessive mortgages and financial risks for farmers? We know it is possible for a group of famers, who are in an interdependent situation, to organize and govern themselves to obtain continuing joint benefits from the collective management of commons (Ostrom, 2005; Termeer et al. 2013, Huntjens, 2021). For South-Holland new organizational forms, such as food councils or regional cooperatives (for instance the existing project 'Land of Values' (*Land van Waarde*) could be further explored. This also requires stronger involvement of the plural sector, which in particular could boost co-management and shared ownership of urban and rural Commons.

- ***Fair price for food makers:*** How can we pay a fair price for food products and producers in a society that expects sustainable food production, which at the same time contributes to public health, animal welfare, climate change adaptation and mitigation, biodiversity, nature conservation, etc. That is only possible if farmers receive a fair price for their products and related investments, for example by further developing methods for true cost pricing, but also be exploring systems of stacked rewards, in which the farmer submits a plan for sustainable farming to a regional council or cooperative, and in return will get access to land, lower interest rates for loans, and other rewards.

- ***Multiple value creation and circular business models:*** A transition from linear to circular business models is a major challenge for many food pioneers. It often requires a multiple value creation approach by taking into account the circular ecosystem encompassing suppliers, customers, research centres, and public authorities, in which each actor/stakeholder plays a specific role, based on effective interorganizational relationships (Zucchella & Previtali, 2019). Such a circular business model aims to reduce waste while also making best use of the 'wastes' produced by using economically viable processes and procedures to increase their value (Toop et al., 2017).

- ***Overcoming legal barriers for innovation in the agri-food sector:*** It regularly appears that the complex regulations concerning agriculture and waste processing are major barriers for many experimental projects. While entrepreneurs and (potential) innovations are encouraged with provincial policy, they are frustrated by the legal system, often due to an accumulation of required permits. For instance, (European) legislation considers waste streams that leave the company as waste, making it forbidden to transport them and use them as raw materials, which makes it very difficult for realizing circularity between companies. A solution could be to combine different parties involved into one company, so that the "residual flows" do not leave the company and do not count as waste. A central problem is how we define waste, and there might be more legal room to manoeuvre than is assumed. It is possible to deviate from a rule of law for a certain period of time, but this is not considered to be a structural solution. There is also a new phenomenon, the Right to Challenge, where initiators can take over tasks from the government if they think they can do better, although we are not aware yet of examples with the application of this in the context of agriculture.

The next phase of the transition approach is currently taking shape and will focus on the acceleration and broadening of sustainable innovations and experimental projects, as well as further knowledge development and the establishment of new partnerships with existing and new regime players (e.g. through Green Deals and Green circles). The Food Family is expected to transform into an independent network organization, while new topics will get a more prominent place on the transition agenda in South-Holland, such as circularity (in combination with the Greenport), the water, food and energy nexus, and food-health relations. At the same time, it is clear that a number of challenges for the current experimental project need to be dealt with in order to grow from niche players to larger players, and by doing so, transforming the current agri-food regime.

Conclusion

In the Dutch agri-food sector and beyond, many innovative entrepreneurs, citizens, coalitions and other parties are already actively engaged in the food transition, for example in realizing short food supply chains (SFSC), community-based agriculture (CSA), connecting city and countryside, the protein transition, regenerative, nature-inclusive agriculture (NIL) and true cost accounting (TCA).

The South-Holland Food Family shows how different parties have engaged in a collective learning process that is highly transdisciplinary in nature. In doing so, it is necessary to not only involve the "new" players and initiatives (niches), but also explicitly make connections with large and existing parties (regime), including government, food producers, landowners, and supermarket chains that are part of the food system. This is to gain insight into how their activities contribute to the transition to a sustainable food system, or possibly make this transition more difficult.

The example of TSEI-framework application in this paper shows when and how local agents change the institutional context itself, which provides relevant insights on institutional work and the mutually constitutive nature of structure and agency. The above institutional analysis also shows the pivotal role of a number of actors, such as network facilitators, including enterprising civil servants, and the provincial minister, as well as their capability and skills to combine formal and informal institutional environments and logics and mobilize resources, thereby legitimizing and supporting the change effort. The results are indicative of the importance of institutional structures as both facilitating (i.e., the province's policies) and limiting (e.g. land ownership) transition dynamics. Interestingly, while the provincial government holds some power over such institutions, it also has to operate in wider national and EU institutional settings that are beyond its direct influence. This

changes the role of the province. Where it started out as an 'enlightened incumbent' with an innovation programme, it now is slowly taking on a more 'pioneering' role in its wider institutional environment. Hence, the transition policies reflexively have changed the province's role and identity.

Based on the experiences with the transition approach for sustainable agriculture in South-Holland, a similar approach is now also introduced for other major policy changes within the province, such as the transition to a circular economy and the energy transition.

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