



Transformations towards sustainable food systems: contrasting Swedish practitioner perspectives with the European Commission's Farm to Fork Strategy

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Abstract

This study explores features of food system transformations towards sustainability in the *Farm to Fork Strategy* in relation to perspectives of Swedish food system practitioners. Transformations towards sustainable food systems are essential to achieve the United Nations' 2030 Agenda and the need for more sustainable food systems has been recognised in the *European Green Deal* and its *Farm to Fork Strategy*. The Swedish ambition to act as a global leader in achieving the 2030 Agenda and the European Commission's aspiration for Europe to lead global food system transformations offer a critical opportunity to study transformational processes and agents of change in a high-income region with externalised environmental and sustainability impacts. Drawing on theories of complex systems transformations, this study identifies features of food system transformations, exploring places to intervene and examines the roles, responsibilities, and agency related to these changes. The results of this study provide three main conclusions highlighting (i) alignment of high-level policy and the perspectives of national practitioners at the paradigm level, especially concerning how food is valued, which is a crucial first step for transformational processes to come about (ii) a lack of clarity as well as diversity of pathways to transform food systems although common objectives are expressed, and (iii) governance mechanisms as enablers for a diversity of transformations. Moreover, these processes must acknowledge the contextual and complex nature of food systems and the level of agency and power of actors.

Keywords Food policy · Europe · Leverage points · Complex systems · Food production and consumption · Transformational leadership

Introduction

Transformation towards sustainable food systems is a core challenge of our time. Food production and consumption include major environmental impacts and are linked to health-related challenges, making food policies a vital component of the realisation of the sustainable development goals (Campbell et al. 2018; Willett et al. 2019; FAO et al. 2020). The towering challenge to achieve the Paris Agreement and the full palette of sustainable development goals

shows that sectorial and segmented incremental change will not be enough to ensure food security and safety while, for example, also maintaining biodiversity. This realisation is encapsulated in the headline of the UN 2030 Agenda 'Transforming our World' (UN 2015), signalling that 'profound and enduring non-linear systemic changes, typically involving social, cultural, technological, political, economic, and/or environmental processes' (Linnér and Wibeck 2019, p. 4) are required to succeed with the agenda. Similarly, systems perspectives are applied in research on food security and global environmental change as attempts to address this complexity (e.g. Ericksen 2008; Ingram 2011). Such an approach requires that a reductionist and linear cause-and-effect modus operandi be rejected, and that the effects of interactions throughout the food system be considered.

While it is commonly recognised that transformative changes in food systems are necessary and must be intensified in the near future to achieve the SDGs (Campbell et al. 2018; Willett et al. 2019; FAO et al. 2020), it remains largely

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unclear how these changes are to come about (Linnér and Wibeck 2021). Tangible pathways towards sustainable food systems could materialise through current initiatives, such as the FAO (2019) exploring how transformations of food systems can contribute to the 2030 Agenda, the first UN Food Systems Summit in September 2021, and the *Farm to Fork Strategy* launched by the European Commission (European Commission 2020). The Strategy, described by the European Commission (2020, p. 4) as ‘the heart of the Green Deal’ and a key to achieve the SDGs, addresses food policies and the sustainability of food chains within the EU but also globally. Moreover, the Strategy is instrumentally linked to the development of the new Common Agricultural Policy (CAP) for 2023–2027 (European Commission 2022). It remains to be seen what such a transformative systems approach means in practice and what it would entail when everyday challenges of food system management meet the institutional structures and priorities of these policies.

This paper contributes to contextualising the calls for food system transformations towards sustainability by contrasting the *Farm to Fork Strategy* with perspectives of food system practitioners.¹ To understand the context of policies charting out pathways towards food system transformations and bring further clarity to how food system transformations are made sense of among potential proponents as well as laggards and opponents, attention is turned to the practitioners in a country aspiring for sustainability transformations. Thus, this paper specifically studies perspectives of Swedish practitioners with professional focus on different parts of the food system. The European Commission expects the European Union and its member countries to take the lead in transformations towards sustainable food systems and Sweden strives to be one of these frontrunners. Sweden is considered to have high standards for environmental protection, animal welfare, and food safety, and to have favourable conditions for transformations towards sustainable food systems (Kuylenstierna et al. 2019). This corresponds to the country’s self-image, reflected in the Swedish government’s bill *A National Food Strategy for Sweden – more jobs and sustainable growth throughout the country* (Ministry of Enterprise and Innovation 2017). Considering Sweden’s aspiration of becoming a role model when the EU aims for global leadership, the perspectives of Swedish practitioners can provide important insights to further the understanding of the contexts in which transformation pathways towards sustainable food systems take place.

In light of the need of food system transformations and the frontrunner ambitions expressed by the EU and Sweden, this study aims to identify features of potential food system transformations to understand how practitioners’ perspectives and priorities align with or differ from supranational decision-making. We specifically compare how food system transformations are outlined in the high-level politics of the EU’s *Farm to Fork Strategy* and among Swedish food system practitioners.

Background

While food production and consumption are essential parts of food systems, understanding these is not enough to address the complex challenges that transformations entail (Sobal et al. 1998; Ericksen 2008; Ingram 2011; Dentoni et al. 2017). The concept of ‘food systems’ has been used in research for several decades (Ingram 2011), where approaches that focus on food chains, food cycles, food webs, and food contexts have been most common in the field (Sobal et al. 1998). The term ‘food systems’ is defined here as comprising all activities and actors related to the production, processing, packaging, distribution, retail and consumption of food, and the outcomes of these activities that affect food security, social welfare and environmental welfare (Ericksen 2008; Ingram 2011; Willett et al. 2019).

A substantial amount of research into sustainable food consumption has focused on consumption choices, diets, and communication of environmental and health impacts to consumers (e.g. Sirieix et al. 2013; Grunert et al. 2014; Martin and Brandão 2017; Rööös et al. 2018; Spendrup et al. 2019). However, multiple scholars have argued that sustainability research must direct its focus onto the underlying reasons for systems being unsustainable, instead of single dimensions of sustainability, and recognise potential negative impacts, to avoid trade-offs and to enable sustainable pathways (Abson et al. 2017; Weitz et al. 2018; Campbell et al. 2018; Tälle et al. 2019; Wiréhn et al. 2020). Transformations research has emphasised the importance of addressing power and politics, as well as the roles of agents and agency, which has been noted to be underplayed in research on sustainability transformations (El Bilali 2019).

Several large-scale food system changes have been observed throughout history (Pereira et al. 2020). The most recent changes concern the development of alternative food networks (Pereira et al. 2020) and ecological and geographical circumstances gaining attention (Lamine et al. 2019). Pereira et al. (2020) argue that these changes have been driven by consumer demands for transparency and the development of certifications and have to some extent contributed to less input-intensive agriculture, improved conditions for primary producers, shorter supply chains,

¹ The definition of food system practitioners in this study follows Ericksen’s (2008) framework of food system activities, describing persons engaged in activities related to producing, processing and packaging, distributing and retailing, and consuming food.

and more focus on local and high-quality food (Lamine et al. 2019). These characteristics have also been linked to the power of certification bodies and increased inequality in access to high-quality food (Pereira et al. 2020), raising concerns of the possibility of consolidating environmentally friendly food and social justice (Lamine et al. 2019).

The dominant global supply chain regime, characterised by unsustainability, anonymity, and focus on commodities, has not been replaced but has rather incorporated aspects from these new developments (Lamine et al. 2019; Pereira et al. 2020). Stringer et al. (2020) suggest that voluntarism and the market have not been able to deal with the unsustainability of the current food regime to a sufficient degree which has generated calls for stronger governance that is good, inclusive, and equitable. Moreover, it has been argued that such governance needs to be diverse, acting at multiple levels, and be open to innovation to accommodate several different possible transformation pathways (de Krom and Mulwijk 2019; Stringer et al. 2020).

The Swedish context exemplifies the complexity and multi-faceted aspects of food systems and sustainability. While being considered as having high environmental standards (Kuylenstierna et al. 2019), the global environmental impacts of Swedish food consumption are nevertheless significant, due to a large fraction of imported food (Sandström et al. 2018; Steinbach et al. 2018; Moberg et al. 2020). According to Sandström et al. (2018), the emissions of greenhouse gases per person and year, generated by the average Swedish diet, are the second highest in the EU and more than half of these emissions occur outside of Sweden. In the most recent Sustainable Development report by Sustainable Development Solutions Network and Bertelsmann Stiftung, Sweden is ranked 141 out of 165 in the spill-over performance due to high environmental and social impacts embodied in trade, although ranked as number two in the overall performance on the Sustainable Development Goals (Sachs et al. 2021). The dependence on imported food, feed, fertilizers, and other essential inputs has also raised concerns about the vulnerability of the Swedish food system, which motivated the *National Food Strategy for Sweden* (Ministry of Enterprise and Innovation 2017) and an investigation of the securitisation of food supplies in times of crisis (Livsmedelsverket 2020).

The paper is structured as follows: first, we outline the analytical framework, materials, and methods of the study. Second, we present our results from the analysis of the *Farm to Fork Strategy* and focus group interviews with Swedish practitioners. Finally, we present a discussion and subsequent conclusions regarding features of food system transformations towards sustainability by contrasting the *Farm to Fork Strategy* with the perspectives of Swedish practitioners.

Analytical framework, materials, and methods

This study draws on two sets of data: the *Farm to Fork Strategy* document (European Commission 2020) and material from focus group interviews with practitioners from Swedish food systems. The material was qualitatively analysed through a three-step process (see Supplementary material, Figure S3) identifying categories and features inspired by previous research in the field. The method recognises the importance of stakeholder engagement in transformative processes (UN 2015; Moser 2016; Kuenkel 2019; Sachs et al. 2019). Perspectives of food system practitioners can provide understanding of the notions and realities of those affected or those who are responsible for the implementation of policies when striving to reach the intended outcomes. Future implementation of policies designed to create transformative change in food systems could benefit from such knowledge.

Analytical framework

An influential conceptualisation of system changes in the transformations literature is Meadows (2008) list of 12 places to intervene in a system. This study draws on Meadows (2008) theory of complex systems as well as subsequent studies that have used the concept to assess factors and sustainability interventions that can compel transformative change in a given system (Abson et al. 2017; Linnér and Wibeck 2021), and in food systems explicitly (Malhi et al. 2009; Dorninger et al. 2020). Based on these studies (Malhi et al. 2009; Abson et al. 2017; Dorninger et al. 2020), the present study adopts categories of places to intervene (Table 1) to analyse features of potential food systems transformations, and the roles, responsibilities, and agency of various actors.

Several concepts have been used to understand and describe the characteristics of transformative changes and how they can come about (Meadows 2008; Malhi et al. 2009; O'Brien and Sygna 2013; Abson et al. 2017; Linnér and Wibeck 2021) and the key terminology, including *levers*, *interventions*, and *leverage points*, has been presented with different definitions (Leventon et al. 2021). In this study, we use the term *features* to describe themes, topics and aspects of food systems that were brought up in the focus group interviews and the *Farm to Fork Strategy*. These features are linked to places to intervene in food systems, where levers can be applied with the intention of creating transformations or steering emergent transformations (Fraser 2009; Linnér and Wibeck 2021).

Table 1 Analytical framework, based on Abson et al. (2017); Malhi et al. (2009); Meadows (2008)

Categories of ‘places to intervene’	Description
Paradigm	Mindset and (unspoken) deep beliefs. Creates the system and is the source of goals, governance, information and knowledge, and infrastructure. Can also include ‘seeing’ the paradigm, understanding how it works, and how it can change
Goals	Targets and aims of the system. More concrete formulations of the paradigm and targets that must be achieved to change the paradigm
Governance	The rules of and the power to change the system. Regulations, policies, subsidies, taxes, and standards
Information and knowledge	Information flows, knowledge production, traceability, and transparency. Level of knowledge and the capacity to understand and acquire knowledge and information
Infrastructure	The physical elements of the system and how they are connected, e.g. trade and financial flows

Table 2 Description of focus group participants

Focus group (FG)	Group characteristics	Female: male
1	Small-scale farmers, mainly vegetable, dairy, and livestock production	2:2
2	Regional officials in rural and agricultural development	4:1
3	Rural and agricultural developers and food production sector representatives	1:3
4	Politicians, farmers’ association regional representative, local food production, and supply system representative	3:1
5	Representatives of a business network and a national authority, both working with climate change	1:1 11:8

The participants represented organisations/activities based on the region of Östergötland, except for Group 5, which represented national organisations

When examining the governance category of places to intervene in systems, we analyse governance mechanisms following Michael Howlett’s taxonomy (Howlett 2011)—which distinguishes between *substantive* governance mechanisms, such as the distribution of goods and services, and *procedural* governance mechanisms, such as when actors are involved in policymaking and implementation. Further, Howlett distinguishes between the purpose of a governance mechanism and the resources it mobilises to achieve the desired outcome. The resources can either concern the (i) nodality, that is the government’s ability to handle and disseminate information; (ii) authority, the government’s legal power; (iii) treasure, the government’s ability to fund or tax; and (iv) organisation, the government’s ability to draw on material resources to coordinate and steer interactions.

Focus group methodology

Recruitment strategy and participant characteristics

Participants for the focus group interviews were recruited by purposive sampling, during which specific participants with key positions in Swedish food systems were sought out and invited to participate, due to their experience and

knowledge in the field of interest of this study (Ritchie et al. 2003; Teddlie and Yu 2007). The aim was to recruit a broad spectrum of food system practitioners, from all parts of the food system and at different geographical scales. In line with Ericksen’s (2008) framework for food systems, we identified food system activities and actors, representing *production, processing and packaging, distribution and retail*, and *consumption*. Attempts were made to recruit representatives from national food retail without success. However, several participants were involved in regional distribution and small-scale retail or had experience from large-scale retail sector. While individual consumers were not represented, participants frequently raised consumer perspectives, and two participants represented the perspective of cafés, restaurants, school kitchens, and home economics, activities encompassed in *consumption*. In Table 2, the characteristics of the different focus groups are described. A more detailed description of each participant can be found in Table S1. The groups were partially homogenous in the sense that all members shared an interest and were active in the field of food systems. Homogeneity can be important, as the participants of homogenous groups can feel more comfortable and find it easier to share ideas, opinions, and experiences (Hydén and Bülow 2003; Wibeck 2010; Morgan 2012).

Focus group interviews

This study employed focus group interviews (Wilkinson 1998; Wibeck 2010; Morgan 2012), which were supported by visual representations and an interactive visualisation tool to allow for more engagement and interactions between participants. Focus group methodology was employed to allow for exploration of socially shared knowledge which is formed and maintained in and through dialogical thinking and communication (Marková et al. 2007). The study does not intend to create generalised representations of views in Swedish food systems or a full report of all possible features of transformations. Instead, it includes an exploration of food system transformations and related features, as expressed by the participants in the context of the study (Linnér and Wibeck 2019).

Five focus group interviews with food system practitioners were held between June and November 2019, in several locations in Östergötland and Stockholm, with a total of 19 participants (Table 2). The focus group sessions were 2 h long and comprised semi-structured dialogues led by two moderators (Barbour 2007; Morgan 2012; Hennik 2014). The moderators posed open-ended questions (Table S2) to guide the discussions and presented visual representations of externalised resource use and the related environmental impacts of food production. The ResFlow visualisation tool (Navarra et al. 2020; Figure S1) was used to explore complex global trade flows for the embedded consumption of soy, wheat, maize, and rice, and to stimulate discussions on such topics as geographic patterns, import dependencies, exporting countries, and the complexity of food systems. A ranking template ('Decision Support Tool'; Figure S2) was used to support discussions around actors, roles, responsibilities, and agency in food systems at the end of the focus group interviews.

Analysis of features

The analysis of features followed a three-step process where the material first was manually coded using the software NVIVO 12 (QSR International Pty Ltd. 2018) based on the categories of 'places to intervene' (Table 1). In a second and third step the results of this coding were analysed further to identify and cluster recurrent and relevant features (Krueger 1998) and to explore differences and alignments within each category. The process is described in more detail in Figure S3. It should be noted that the *European Green Deal* and the *Farm to Fork Strategy* were launched shortly after focus group sessions had been held, which provided an opportunity to explore the participants' views on food system transformations as separate from the Strategy.

Results

The *Farm to Fork Strategy* represents the strategic perspectives and priorities of the European Commission, outlining how the *European Green Deal* can apply to food systems and offers a framework and agenda for the implementation of the new CAP. The perspectives of the Swedish practitioners provide insights into national and local aspects on food system transformations. In this section, we outline the features of food system transformations that were identified in the *Farm to Fork Strategy* and among Swedish practitioners, ordered by the categories of places to intervene (Table 1). Figure 1 provides a facilitating overview of the results, summarising the main features identified and indicating alignments and differences between the two studied materials.

Paradigm

The Farm to Fork Strategy

The *Farm to Fork Strategy* presents itself as a new 'approach to how Europeans value food sustainability' (European Commission 2020, p. 4), and it argues that people are increasingly looking for 'value in food' (*ibid*). Inclusive and sustainable economic growth is presented as a vital part of food system transformations, which is stressed by phrasings, such as 'boost the economy' and 'encourage and enable' (European Commission 2020, p. 5), placing the Strategy into the current economic paradigm. It is also stated that transformations towards sustainable food systems should be considered a business opportunity that will generate profit, enabling European food system actors to engage as first movers. They can in this way capitalise on the transition towards the new paradigm in which 'ultimately the most sustainable food also becomes the most affordable' (European Commission 2020, p. 7).

Practitioners

In all focus group interviews, a dominant topic was the role of food and agriculture in society, with a particular focus on how people value and relate to food and natural resources. The participants argued that the Swedish population in general does not value food, by referring to a lack of appreciation for the labour and natural resources required to produce food, and that farming is often portrayed as causing environmental pollution. The participants compared this to, what they considered, the highly valued and strong cultural position of food and agriculture in other European countries.

All focus groups called for significant deep changes in mindset and perception. Such changes were related to

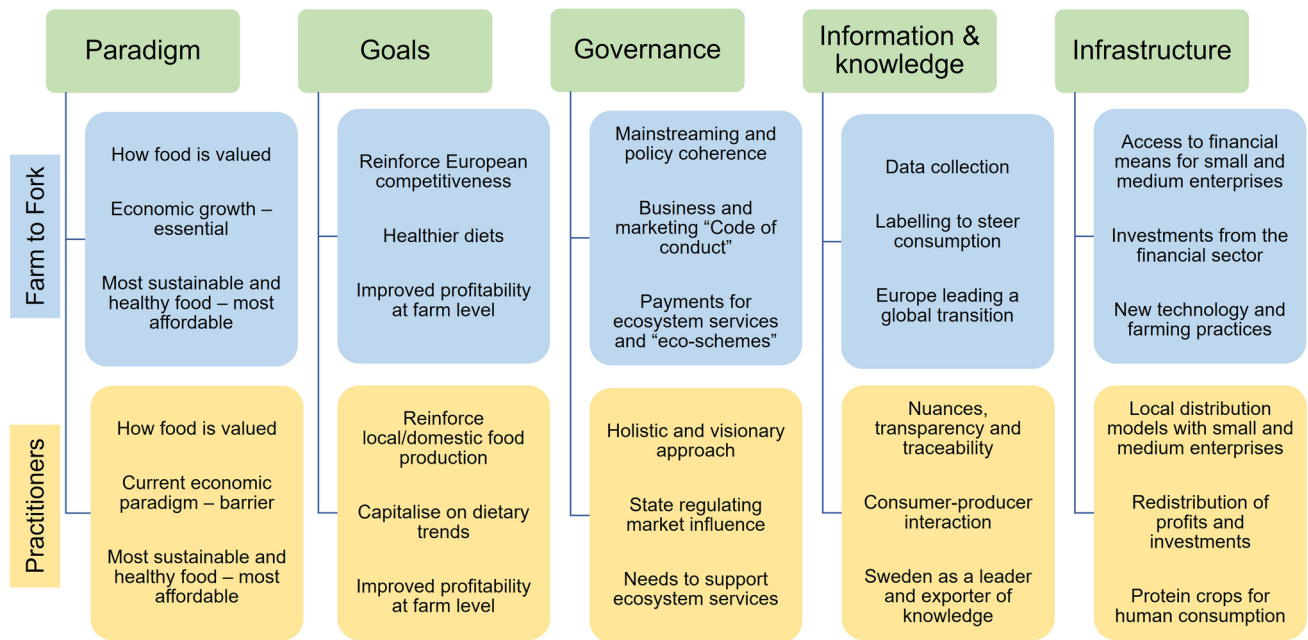


Fig. 1 A summary of the main features of transformations towards sustainable food systems as identified by Swedish food system practitioners compared to the Farm to Fork Strategy

acknowledgement of the true value of food, to consider food as an experience and culture, and that consumption choices should be based on quality rather than price. A connection between people, rural and urban communities, culture, and food production was called for, reconnecting to something that has been lost. Participants further described a current paradigm where the economic system is based on constant economic growth driven by consumption, and the idea that ‘consumption makes us happy’ (FG4), while exploiting society and the biosphere beyond their capacity. While Sweden is often portrayed as a country rich in natural resources, participants suggested that this can be linked to a belief that resources are unlimited, which results in wasteful behaviour. However, it was also expressed that everyone, regardless of level of income or degree of knowledge, should be able to afford and access the most sustainable and healthy food.

The true value of food

Both the *Farm to Fork Strategy* and the practitioners recognized a development where consumers increasingly are seeking value in food, but also argue that most consumers require more accessible and adequate information to appreciate the true value of food (see Fig. 1). The *Farm to Fork Strategy* describes consumers as a major driving force in transforming food systems, while recognising that agency cannot rely solely on consumers, but would require a concerted effort from retail, production, and policy to enable substantial changes. Swedish practitioners emphasised the disconnect

between consumers and food production in terms of the true value of food and argued that policy and economic frameworks constitute key barriers, as these frameworks still promote the concept of cheap food and consumerism as an element of the current economic paradigm, which consumers alone do not have the agency to address.

Goals

The Farm to Fork Strategy

The Strategy outlines several goals for achieving sustainability transformations, including increased food security and resilience, a reversal of biodiversity loss, and a preparedness to handle crisis events and economic downturns. The goal of ensuring food security is raised in relation to a food supply that is ‘safe, nutritious, affordable and sustainable’ (European Commission 2020, p. 12), and, importantly, ensuring that the supply can be maintained during crises. Two additional but major goals set by the *Farm to Fork Strategy* are that food systems should function within the planetary boundaries and that the environmental impacts of food chains should be neutral or positive. Explicit targets are formulated, addressing reductions in the use of hazardous pesticides, fertilisers and antibiotics, and nutrient loss, increase of the share of land under organic farming and reduction of food waste by 2030. However, explicit targets for reductions in greenhouse gas emissions from food systems or externalised impacts are not included. The Strategy

also aspires to reduce the consumption of red and processed meat in favour of a plant-based diet, primarily motivated by concerns for human health. Overall, a vision of Europe leading a global transition and setting a global standard for sustainable food systems is presented in the Strategy. European competitiveness and the creation of competitive advantages linked to sustainability along with ‘...common definitions and general principles and requirements for sustainable food systems and foods’ (European Commission 2020, p. 8) are emphasised for this to be achieved.

Practitioners

The main goal discussed by all focus groups was to increase the production and consumption of Swedish and local food and reduce the import of agricultural products. In doing so, other important goals would be met, such as improved profitability at farm level, redistribution of profits in the food system towards primary producers, and strengthening food self-sufficiency and security. Some participants argued that Sweden could contribute to decreasing the global environmental footprint of food production and consumption by increasing its production and exporting more food commodities. They based this claim on the conception that Swedish food production is ‘perhaps [...] one of the most sustainable in the world’ (FG3), and that there is an abundance of natural resources, such as freshwater, in the country. Participants also called for increased consumption of Swedish meat and meat products, and suggested that this would have positive environmental effects, such as supporting biodiversity, that imported meat and meat products do not entail. Nevertheless, they argued that there is room for improvement, in terms of reducing waste and better use of natural resources, at all levels of the Swedish food system. The need for increased consumption of whole foods, vegetarian products, and products in season was also discussed in relation to healthier diets and environmental impacts.

Food system resilience, security, and sustainability

The key goals outlined in the *Farm to Fork Strategy*—food security, resilience, and the need to ensure that the food system functions within the planetary boundaries—were also discussed by the practitioners, although with different orientations and perspectives. The Strategy presents food security as closely related to food system resilience, while the Swedish practitioners rather centred discussions around self-sufficiency. They considered Sweden’s role in the global food system as a source of vulnerability and described increased production and consumption of locally produced food as a pathway towards sustainable food systems. The need for shifts in diets in terms of consumption of more plant-based foods and reduction of red and processed meat was raised

in both materials. While the Strategy presents this predominantly in relation to human health, the practitioners identified an opportunity to capitalise on emerging sustainability trends (see Fig. 1).

Governance

The Farm to Fork Strategy

The *Farm to Fork Strategy* aims to provide a common vision for the EU member states, aligning food systems to the aims of the *European Green Deal*. In doing so, *The Farm to Fork Strategy* outlines a large range of governance resources relating to *nodality*, such as the ability to manage and disseminate information, knowledge, and communication. To ‘empower consumers to make informed, healthy, and sustainable food choices’ (European Commission 2020, p. 14), mandatory labelling of food and restrictions in marketing strategies, mainly in relation to human health, are proposed. The inclusion of environmental impacts and social aspects in labelling is not described as mandatory, but is suggested to be developed together with citizens, stakeholders, and national, regional, and local assemblies of member countries. The Commission further proposes a voluntary ‘code of conduct for responsible business and marketing practices’ (European Commission 2020, p. 13), to be complemented by legislative interventions if progress is insufficient.

In terms of *authority*, the Strategy outlines the requirements that food corporations integrate sustainability in their business strategies and describes the need to regulate marketing campaigns. The Commission proposes minimum mandatory criteria for sustainability to be developed for public procurement processes and that existing environmental, animal welfare, and pesticide use legislations be enforced.

Governance resources that relate to funding and taxation, i.e., *treasure*, are addressed in terms of financial support to farmers through payments for carbon removal and eco-schemes. While it is acknowledged that food system transformations will change interactions and economic structures in many EU regions, the Commission argues that existing EU funds will be able to support the changes financially. Taxes and VAT rates are proposed to be used to support the production of organic fruit and vegetables, to encourage consumers to make dietary choices that are both sustainable and healthy, and to make food prices reflect the real costs of natural resource use and pollution.

In terms of *organisational* resources for governance, the *Farm to Fork Strategy* addresses the need for coordinated efforts by the European Union, including the development of a contingency plan to address food security and safety in the event of a crisis. It suggests several measures to support primary producers, such as clarifying competition rules and stimulating the supply of and demand for organic food. The

Commission wants to ‘harmonise voluntary green claims’ (European Commission 2020, p. 14) and aims to urge food companies and organisations to commit to take ‘actions on health and sustainability’ (European Commission 2020, p. 13). In general, the Strategy emphasises that sustainability should be mainstreamed in all food policies, as well as the importance of policy coherence, both at EU and national level.

Practitioners

The focus group participants argued that food systems are a political issue. The discussions outlined a lack of integration, prioritisation, and trade-off assessments in authorities, policies, and regulations, linking to *authority* as a governance resource. Participants stated that authorities have insufficient understanding and knowledge of the food system as a whole, and that it is a shortcoming that no authority has responsibility for sustainability. Existing policies and regulatory and supporting systems were described as hindering agricultural and sustainable development, and not satisfying the needs of non-traditional agricultural production and distribution infrastructures, especially concerning small and medium-scale actors. Participants called for a more visionary approach that would allow new production systems and distribution infrastructures to be developed. Public procurement was mentioned in relation to these discussions as an example of an *organization* governing tool that could be used more to inspire sustainable consumption and to modify demand towards certain products and certain locations and methods of production.

Participants frequently raised the idea that *treasure* mechanisms, such as subsidies, taxes, and financial instruments, should be designed to support agricultural systems that create ecosystem services, such as carbon sequestration, or social benefits. They criticised the financial instruments of the Common Agricultural Policy (2014–2020) for not supporting services for sustainability while at the same time making cheap food available. This, they claimed, directed financial support to consumers instead of farmers as well as creating unfair competition, which was seen as one of the reasons for Sweden’s low self-sufficiency in food supply. The labour costs, agricultural inputs, and climatic conditions were put forward as barriers that make it difficult for Swedish commodities to compete with cheaper, imported products. In line with the Strategy, participants argued that food prices should reflect the true cost of the natural resources required for production, accounting for emissions, pollution, and the environmental externalities caused by agriculture. The Carbon Border Adjustment Mechanism was mentioned as an example of a mechanism that could create more equal terms, and thereby improve the global sustainability of food production.

In terms of *nodality*, the participants argued that consumers are ‘in the hands of’ market forces, lobbyists, and large retail chains, and thus not in control of their choices. As such, retail chains were blamed for ‘indoctrinating’ consumers with the message that ‘food is supposed to be cheap’ (FG4), which was directly associated with unsustainable and unhealthy food. It was suggested that governmental bodies need to reach and influence consumers through information and legislation and leading by example to steer consumers towards more sustainable choices.

Mainstreaming policies towards comprehensive governance

Both the practitioners and the *Farm to Fork Strategy* pointed at mainstreaming sustainability policies and taking a comprehensive approach to achieve policy coherence (see Fig. 1). Based on their experience, practitioners identified a lack of coherence, poor adaptability to structural innovation, and narrow perspectives on food systems as major governance barriers that constrain primary producers in particular. In the Strategy, four out of five explicitly expressed targets are linked to primary production (pesticides, fertilizer, antibiotics, and organic farming) and the proposed eco-schemes similarly rely on farmers quickly adapting their production methods. These proposals could be put in contrast to the experience expressed by the Swedish practitioners, that farmers often are blamed for the environmental impacts of food systems, and that the degree of culpability cannot be justified.

Information and knowledge

The Farm to Fork Strategy

The nodality aspects of the *Farm to Fork Strategy* are particularly pronounced, with a strong focus on data collection, data management, and communication, as part of the intention to support an increased collection of data from food systems. It is suggested that data on production, land use, environmental impacts, food waste, competitiveness, and health are collected, and that methods be developed to calculate environmental footprints. Knowledge and advice to all actors, along with research and innovation, are identified as key drivers for food system transformations. Primary producers in particular are recognised as needing advice and guidance, and should be connected with innovation and research projects. The *Farm to Fork Strategy* points out that marketing strategies and food price campaigns conducted by grocery stores and food labelling are important tools to influence consumer choices and their understanding of the value of food. An EU-wide ‘sustainable labelling framework’ (European Commission 2020, p. 14), that communicates

nutritional and sustainability aspects of food products, is planned to be created.

Practitioners

Practitioners indicated that improving information and knowledge about food production is a key challenge, given the complexity of the topic. Nuanced and freely available information for everyone was considered to be important, while participants acknowledged the challenges of interpretation and implementation. In relation to these discussions, transparency and traceability throughout food systems were brought up as essential.

Urbanisation and the large fraction of imported products available to consumers were described as factors that may have contributed to a general distance between consumers and food production, rendering agricultural activities and their effects invisible. Nuanced and valid information and knowledge were considered to be vital for sustainable food systems and the participants argued that consumers require more detailed information, for example by more extensive labelling of food products in grocery stores. However, it was discussed whether consumers themselves can handle the range and complexity of the information required to make sustainable food choices. Farmers' markets, local food nodes, and community-supported agriculture were presented as possible means to communicate complex information to consumers, as these facilitate a direct relationship between producers and consumers and thereby better understanding of food and its value.

Furthermore, participants argued that Sweden possesses a great deal of knowledge about sustainable use of antibiotics, sustainable food production, circular economy, climate change, and agricultural systems in general, suggesting that this knowledge could be used more extensively to strengthen Sweden's position in the global market and be developed to an export product.

Knowledge, advice, and research as key drivers of transformations

Both the *Farm to Fork Strategy* and the practitioners raised that the EU and Sweden have ambitions to spread knowledge on sustainable food abroad in order to support transformations globally, and asserted that knowledge, advisory and support services, and research as key drivers of transformations (see Fig. 1). The Strategy considers that knowledge provided by food labels and footprint calculations empowers consumers to make sustainable choices. However, the practitioners saw challenges in conveying correct but easily understood information of complex production processes, which raised questions about the data literacy of consumers and how they interpret this information. Both the *Farm*

to Fork Strategy and the practitioner discussions identified the retail sector as a powerful actor in driving consumers' perceptions. In contrast to the Strategy, practitioners also ascribed the media, politicians, and food processing companies a potential transformative agency, but argued that these actors were currently not capitalising on this agency to change perceptions of food.

Infrastructure

The Farm to Fork Strategy

Circularity in terms of a bio-based economy at societal scale and opportunities for renewable energy at farm level are two key concepts related to *infrastructure* in the Strategy. New technological tools, such as biotechnology, precision farming, and artificial intelligence, are presented as important aspects of sustainable food systems. The Strategy suggests that new sources of protein, with a specific focus on algae, for human consumption and animal feed, will be important for increasing the sustainability of food systems. Agro-ecology, organic farming, carbon farming, and agro-forestry are agricultural practices that the Strategy labels as eco-schemes, and that are described as contributing to more sustainable food production. Furthermore, the Commission outlines the need for investment by the European financial sector that focuses on sustainability, and emphasises how important access to finance for small- and medium-sized companies is. The Strategy recognises that primary producers need increased compensation, and that a 'fairer economic return in the supply chain' (European Commission 2020, p. 7) is required. While the *Farm to Fork Strategy* mentions the need for shorter supply chains as important for improving local and regional food system resilience, it does not put this forward as a major objective, but rather as a consumer request, to be encouraged by supporting reductions in transportation distances.

Practitioners

The structures of current food systems were described by the participants as linear, too large and complex, based on dispersed and globalised systems, and containing too many nodes. Sweden was considered as vulnerable, not just due to low food self-sufficiency, but also in relation to the high import dependency of essential resources, such as fuel, seed, feed, chemicals, fertilizers, and machinery. The participants suggested that circular, shorter, and simpler systems would be preferable, which would also facilitate traceability. Farms were proposed to become more circular by combining crop and livestock production, through the recycling of nutrients, and through farm-based production of bioenergy.

The current food distribution system was criticised by the focus group participants for being dominated by large-scale distribution channels, wholesalers, processors, and retailers. Most of the profit generated in the food system was considered to end up in the retail and processing industry, while financial risks and innovation costs are mainly borne at farm level. It was asserted that an increase in the production and consumption of locally produced food would require distribution infrastructure to be developed. Farmers' markets, local food nodes, and community-supported agriculture, were presented as possible ways to achieve this. While small-scale farming was considered to be more sustainable and resilient than large-scale farming, the participants also argued that medium-sized units are important, since they are needed to provide sufficient amounts of food products to satisfy the demands of public procurement processes and large retailers.

The participants discussed that the trend towards vegan and vegetarian diets is being met, to a large extent, by imported products and proposed that domestic production of protein crops for human consumption be increased. An increase in vegetable production was considered necessary, but difficult to achieve due to climatic conditions, unstable market prices, and the need for large investments to develop production systems and infrastructure. An investment model in which the retail sector bears the costs, providing farmers with financial support during the development phase in exchange for giving retailers exclusive access to the products, was suggested.

Infrastructures of local and global food systems

In contrast to the practitioner discussions, the *Farm to Fork Strategy* does not explicitly address the complex infrastructure of global and local food systems. Here, the Swedish practitioners identified several features that are important in food system transformations, including short geographical distances, small- and medium-sized production units, and reducing the current number of actors (see Fig. 1). Moreover, the practitioners argued that detailed information about origin and production conditions is embedded in the relationship between consumers and producers in these systems, which provides an alternative to food labelling. While practitioners focused on scales and connections of food systems, the Strategy provides numerous suggestions for production-level innovations to increase sustainability.

Discussion

The *European Green Deal*, and in particular the European Commission's *Farm to Fork Strategy*, expresses a high level of ambition held by the European Union and its member

countries to take the lead in transformations towards sustainable food systems. While these supranational policy documents are intended to guide member countries and their food system actors and provide an unprecedented opportunity for significant and transformative changes in food systems, it is crucial to assess how they align with national contexts. This study represents a broad spectrum of actors from the Swedish context, representing to varying extent and on different levels the four groups of actors outlined by Ericksen (2008). As large-scale retail was not represented, we acknowledge that their contribution would have been valuable for more in-depth inclusion of perspectives. In the following section, differences and alignments in the features of the 'places to intervene' are explored and put in relation to previous research.

Shifting the food paradigm

The value of food and natural resources was a reoccurring theme in both the *Farm to Fork Strategy* and several of the focus groups as well as the notion that sustainable food should be affordable for everyone. Shifts towards such paradigms were described as desired, but also already underway. However, the Strategy does not elaborate on how to link the value of food and natural resources to the desired shift towards achieving both affordability and sustainability. In contrast, the Swedish practitioners outlined specific drivers of this change: creating new relationships between food consumers and food producers and highlighting the value of the natural resources and labour required for food production. The latter has been featured in a vast body of literature related to the environmental footprint of food (Campbell et al. 2018; Willett et al. 2019; FAO et al. 2020), but drivers of change will need to address an understanding of the complexity and essence of food with geopolitical, social, and ecological relations (McMichael 2009). Paradigm shifts of this kind require concerted efforts that target the practical, political, and personal scales (O'Brien and Sygna 2013), transforming not only the monetary value of sustainable food production, but also supranational governance mechanisms to align quality criteria and investments as well as the collective mindset of food system actors (Birney 2021; Linnér and Wibeck 2019). This could result in more focus on quality, reduction of food waste, and limited investments in products with low nutritional value, and subsequently make sustainable food accessible to more people. However, food systems are intrinsically part of the economic system, and the share of income that consumers can put towards food is also shaped by other expenditures and investments, subsidies, and taxes. A change of the economic paradigm, which was discussed by some of the practitioners, might be necessary to enable deep changes in mindset, and availability and accessibility of sustainable food.

Diversity of pathways for food system transformations

Despite the alignment between the *Farm to Fork Strategy* and the Swedish practitioners regarding the needed paradigm shifts, multiple features of how to achieve these transformations, in terms of governance, information and knowledge, and infrastructure, could be identified in the materials.

The rise of alternative food networks and the geographically and ecologically focused food systems described by Pereira et al. (2020) and Stringer et al. (2020) were evident in the focus group material, where short supply chains and relational and cultural aspects of food were recurring features. These kinds of systems are often considered to have a higher degree of biosphere stewardship, diversity, inclusion, participation, and self-sufficiency, all of which have been linked to a high resilience of social–ecological systems (Gordon et al. 2017). The practitioners of this study suggested that in alternative and local food networks, producers are in possession of more power regarding sustainability of and information about their products. However, local food systems are not isolated but integrated with each other and other systems at all scales, and function against the background of global trade, trends, and governance (Clapp 2017). In the current dominant food system of global supply chains (Pereira et al. 2020; Stringer et al. 2020), certifications and labelling, as put forward by the *Farm to Fork Strategy*, could be important mechanisms for information transfer. However, large distances, manifested not only in terms of geography, but also as differences in culture, power, agency, and the numbers of actors and exchange points, can, on the other hand, obscure information, while the responsibility for sustainability impacts becomes unclear and contested (Clapp 2014). Certification bodies can be powerful knowledge brokers and shape the understanding of sustainable food production (Pereira et al. 2020), while the consumers' own knowledge and perceptions of sustainability also have a strong influence on their interpretation of labels and food choices (Lazzarini et al. 2018).

The environmental targets presented in the *Farm to Fork Strategy* assign a significant responsibility to primary producers in reaching more sustainable food production as well as adding to the negative image of farmers as polluters, which was a concern among the practitioners. The Strategy proposes new farming practices and technology as means to reach these targets, features that were almost absent from the practitioner discussions. While technology and innovation have been suggested as being significant for transformations to come about in food systems (Herrero et al. 2020), there is also need for caution as there are risks of maladaptation, increased inequalities, lock-ins, and dependencies on a few large companies (Clapp 2018; Stringer et al. 2020). A food system approach is

vital to avoid these trade-offs, as can be exemplified by the proposal to increase production of plant protein for human consumption expressed by the practitioners and the Strategy. Currently, nearly all plant-based products high in protein consumed in Sweden are imported and the small amount of pulses that are cultivated are shipped to Italy for processing and packaging due to lack of facilities in Sweden (Tidåker et al. 2021). Hence, it is not sufficient to solely increase the cultivation of plant protein; processing, distribution, and access for consumers must also be improved.

Developing new farming practices, infrastructures, and technologies to reach the targets may come with increasing costs for farmers. It is possible that compensations will be regulated through the new CAP, although there have been concerns about how effective the governance mechanisms of the CAP are (Pe'er et al. 2020; Heyl et al. 2020; Scown et al. 2020). The question remains, how these measures, aligned with the vision that food prices should reflect the true value of food, would affect the affordability of food as well as the distribution of financial costs within the food system.

The practitioners argued, in line with Béné et al. (2019), that food systems are specific to a geographic area, not only in governance, but also with respect to social factors and cultural heritage. The *Farm to Fork Strategy* indicates similar notions in its ambition to include citizens and stakeholders, at several governance levels, when defining sustainable food and formulating policies. Previous research in the Nordic countries has shown that while there is agreement at large on the key challenges of food systems, local, regional, national, and supranational perspectives on strategies, mechanisms and priorities differ (Karlsson et al. 2018). The results of this study point towards a similar conclusion, indicating the importance of governance and policies to be diverse, acting at multiple levels, and to be adaptive to accommodate several different possible transformation pathways (de Krom and Muilwijk 2019; Stringer et al. 2020). Defining *global* sustainable food systems requires the acknowledgement that many local food systems are linked, and that they aggregate at a global level (Béné et al. 2019). This must be reflected in indicators, policies, and measures. Moreover, it is important to acknowledge that the findings of this study are situated in the context of Swedish agriculture and EU policy, which shapes the norms and problem definitions that underlie the framing of food systems transformations and whose sustainability is addressed (Leventon et al. 2021). To further explore other cultural and geographical contexts, in relation to the *Farm to Fork Strategy* and the European global leadership ambitions, will be of great value for the initiation and understanding of food system transformations.

Governance, roles, and responsibility for food system transformations

Actors and functions that connect consumers and producers, such as retailers, local food nodes and markets, food processing companies, logistics operators, and public and private food services may have an untapped potential for absorbing the financial burden of food system transformations. Willett et al. (2019) identify these actors and functions as not being involved in food system changes, despite their great economic and cultural influence. Thus, they could have a catalytic effect for transformative change, as they can influence both perspective shifts at the paradigm level while wielding the economic power needed to underpin structural change. Hence, these actors and functions support the critical governance roles of nodality and treasure. The practitioners in this study stated that the retailers are overlooked actors, who should take more responsibility for sustainability and financial risks, but also that more governance and support should be directed towards them. The ‘code of conduct for sustainable business and marketing processes’ (European Commission 2020), and the suggested introduction of sustainability criteria, may have significant impacts and may help to balance inherent power structures. While this would enable more effective change, accountability may be lost, since actions taken by retailers might not necessarily support democratically agreed transformative change. Nevertheless, these actors and functions still rely on the authority and organisation of the government, which may enable a combination of effective interventions and political guidance.

Conclusion

This paper compared and contrasted the European Commission’s *Farm to Fork Strategy* with the perspectives of national food system practitioners in Sweden to identify features of food system transformations and discuss implications for food policy. The results of this study provide three main conclusions highlighting (i) alignment of high-level policy and the perspectives of national practitioners at the paradigm level, (ii) a lack of clarity as well as diversity of pathways to transform food systems although common objectives are expressed, and (iii) governance mechanisms as enablers for a diversity of transformations.

First, the results demonstrate that high-level policy and the perspectives of national practitioners appear to be aligned at the paradigm level, which is a crucial first step in transformation processes. In that respect, we identify signals of commencing transformations towards sustainable food systems. While consumers are assigned a significant role in terms of increased interest in food, sustainable food production, and plant-based diets, concerted efforts are required

from all food system actors to capitalise on these current developments, to reach a paradigm shift in the valuation of food in general, as well as the necessary shift in the economic system.

Second, we identified a number of common objectives expressed in the European Commission’s *Farm to Fork Strategy* and by practitioners, e.g. the increase of competitiveness of European food production and redistribution of profits towards primary production. However, the suggested pathways towards these objectives differ. While practitioners emphasized local production as a main factor for transformation, raised the need for deeper structural changes, and provided examples of transformative changes in food distribution and investment models as possible mechanisms, these are greatly missing in the Strategy document. The diversity of how to transform food systems, both in the *Farm to Fork Strategy*, and among the practitioners’ perspectives, shows the complexity of the process and the need to acknowledge and enable several possible pathways that sometimes may include conflicting aspects and entail trade-offs.

Third, this study indicates the importance of governance mechanisms to regulate and support actors, balance inherent power structures, and strengthen their agency to enable transformative action. Both substantive and procedural governance mechanisms can enable a diversity of transformations if they are flexible and adaptive to the unknown, creating possibilities for innovative food system practices and structures. While the *Farm to Fork Strategy* states an ambition to create a global standard for sustainable food systems, this study raises a concern that the development of global criteria and standards is a significant challenge, risking obstructing transformative change, both within the EU and in relation to its trading partners.

This study shows that pathways towards sustainable food systems are diverse, contested, and context-dependent, which needs to be acknowledged and better included in policy development. While this is a case study of the EU and one of its member countries, these conclusions can inform governance processes on diverse scales also beyond the European context. Given the EU’s and Sweden’s ambitions of taking global leadership roles, the results of this study can represent features of transformations in countries influenced and impacted by these ambitions.

Rather than approaching food systems as linear chains, governance mechanisms must address that food systems are intertwined across different spatial and geographical scales, and that they connect global and local actors, policies, cultures, infrastructures, and ecosystems. In these interlinkages and connections, the inherent power structures of food systems must be addressed by empowering consumers, small-scale actors, and primary producers who occupy positions of less agency, and by regulating and supporting retail and other intermediate actors.

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Declarations

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