



European
Commission

CONCEPTS FOR A SUSTAINABLE EU FOOD SYSTEM

Reflections from a participatory process

Joint
Research
Centre

EUR 30894 EN

This publication is a Science for Policy report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication. For information on the methodology and quality underlying the data used in this publication for which the source is neither Eurostat nor other Commission services, users should contact the referenced source. The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Contact information

Competence Centre on Foresight
Unit I.2 Foresight, Modelling, Behavioural Insights & Design for Policy
Joint Research Centre, European Commission, Brussels, Belgium
JRC-EU-POLICY-LAB@ec.europa.eu

EU Science Hub

<https://ec.europa.eu/jrc>

JRC126575

EUR 30894 EN

PDF: ISBN 978-92-76-43727-7 ISSN 1831-9424 doi:10.2760/381319

Luxembourg: Publications Office of the European Union, 2022

© European Union, 2022



The reuse policy of the European Commission is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Except otherwise noted, the reuse of this document is authorised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated. For any use or reproduction of photos or other material that is not owned by the EU, permission must be sought directly from the copyright holders.

All content © European Union, 2022. Illustration by Simon Bailly.

Bock, A.K., Bontoux, L., Rudkin, J. Concepts for a sustainable EU food system, EUR 30894 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-43727-7, doi:10.2760/381319, JRC126575.

CONCEPTS FOR A SUSTAINABLE EU FOOD SYSTEM

Reflections from
a participatory process

Anne-Katrin Bock
Laurent Bontoux
Jennifer Rudkin

Acknowledgements

We would like to thank all the participants of the workshops for their time, active support and valuable inputs at the workshops as well as to the reflection paper.

We are also grateful for the constructive collaboration with colleagues from the European Commission departments for Health and Food Safety, Agriculture and Rural Development, Maritime Affairs and Fisheries, and Environment.

Likewise we are thankful to our JRC colleagues Egle Basyte-Ferrari and Maciek Jastrzebiec-Pyszynski for their valuable input and support to the many workshops in this project.

We would also like to thank our JRC colleagues for their review of this report and valuable feedback, and Jaqueline Whyte for proof-reading of the report.

Abstract

Food systems, worldwide and in the EU, need urgent and significant transformation to become sustainable. The EU Farm to Fork Strategy, a cornerstone of the European Green Deal, takes a food system perspective and sets out actions to move towards a 'fair, healthy and environmentally-friendly food system'. Its Action Plan foresees the development of a legislative framework for sustainable food systems, to facilitate and accelerate the transition towards a sustainable EU food system. The Joint Research Centre of the European Commission carried out an inclusive participatory process to explore possible building blocks for such a legislative initiative. The intention of the exercise was to generate a non-binding source of collective reflections from a broad international group of people with in-depth knowledge of different aspects of the EU food system. The report summarises the collective views provided by the participants. Focussing on food system actors as potential 'agents of change', five building blocks were identified and discussed: a sustainability assessment framework, transparency, dealing with consequences of the transition, policy coherence and multi-level governance, and international trade. In addition, the report includes participants' considerations on key aspects for a transition to a sustainable EU food system and further ideas for actions.

Table of contents



	Executive summary	6
	1. Introduction	10
	2. Process	13
	3. Key actors in the EU food system	16
	4. Building blocks	28
	4.1 First considerations for a sustainability assessment framework	28
	4.2 Transparency in the food system	32
	4.3 Dealing with the consequences of the transition	35
	4.4 Policy coherence & multi-level governance	37
	4.5 International trade for sustainable food systems	42
	5. Working together towards a sustainable EU food system - a visual	46
	6. Making the EU food system sustainable	48
	7. Conclusions	57
	Annexes	60



Executive summary

The EU Farm to Fork Strategy¹, a cornerstone of the European Green Deal², takes a **food system perspective** and sets out actions to move towards a *'fair, healthy and environmentally-friendly food system'*. Its Action Plan foresees the development of a **legislative framework for sustainable food systems**, to facilitate and accelerate the transition towards a sustainable EU food system. The Farm to Fork Strategy states, that this legislative instrument *'will promote policy coherence at EU and national level, mainstream sustainability in all food-related policies and strengthen the resilience of food systems'*. It would be the first of its kind.

The European Commission initiated an **inclusive participatory process** to explore possible building blocks for a legislative framework for sustainable food systems in December 2020. The intention of the exercise was to provide a **non-binding source of collective reflection** from an inclusive and broad international group of people selected for their in-depth knowledge and expertise of most aspects of the EU food system. The European Commission's Joint Research Centre (JRC) developed and facilitated the participatory and system-based process.

This reflection paper is the outcome of this collective intelligence process comprising 33 online participatory sessions between March and June 2021. The interdisciplinary insights presented in this document reflect the input provided by the 44 participants from academia, business, civil society organisations, policy, EU agencies, and international organisations, throughout the project.

As commonly accepted, **sustainability** includes economic, environmental and social dimensions. This project adds some detail to this general picture, especially regarding resilience and ethics.

The **food system** is understood to include all relevant actors, resources in a broad sense, and activities relevant for the production and consumption of food and beverages and their associated wastes, and their impact on the economy, environment and society (including health). The term food system is used in its singular form to reflect the EU-level perspective. However, it is understood that there is an essential territorial dimension to the EU food system, and that it has a great diversity and encompasses many sub-systems (i.e. a plurality).

This process started with the identification of **key actors** in today's food system, as potential 'agents of change', towards whom policy can apply targeted interventions that support the evolution of the EU food system towards sustainability. With these in mind, and based on an exploration of drivers for sustainability-related behaviour, **five building blocks** relevant for a legislative framework for sustainable food systems were identified and discussed further (i.e. relevant elements, aspects and topics for a legislative framework). In addition to these building blocks, some **overarching key aspects** emerged from the discussions and these are summarised below.

Overarching key aspects highlighted during the inclusive participatory process

Importance of non-financial dimensions of the EU food system: The current EU food system is largely characterised by a **predominant focus on only one dimension of sustainability**, i.e. the economic dimension, with most of the attention on (short-term) economic gains and growth while ensuring a high level of food safety.

¹ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system;

² COM(2020) 381 final; COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS The European Green Deal; COM(2019) 640 final

For the EU food system to become sustainable, there needs to be a **paradigm shift** away from a 'productivist view'³ and towards the ultimate purpose of the EU food system, i.e. the long-term provision of food security in a broad sense⁴ for everyone in the EU, without the current threats to the environment and people. A precondition for long-term food security is an EU food system that is sustainable and that does not compromise food systems and food security elsewhere. There was broad agreement among participants that **simultaneous changes across many areas and food system actors** are needed for a successful sustainability transition and that this requires smart integrated policies.

Urgency of action: The size of the challenges linked to the current EU food system that society is facing and the limited time available to change course before irreversible damages (in particular in relation to climate change and biodiversity) are such that, despite ongoing efforts, **significant action needs to start without delay**. These efforts can build on existing structures and the available knowledge and understanding of the food system.

Mandatory approaches: While voluntary measures and agreements (such as the recent EU Code of Conduct on responsible food business and marketing practices⁵) might be useful to initiate change in the short term, substantial change requires the formulation of **ambitious and effective binding rules**. Such rules would provide the necessary reliability and predictability for businesses by setting ambitious goals in combination with a practical timeframe.

Agency, empowerment and responsibility: While all actors of the food system need to do

their part for sustainability, some have more agency, i.e. ability to take action, or to choose what action to take⁶, than others. Through a prioritisation process, this project identified six food system actors considered the most influential for the sustainability of the food system (primary producers, food and drink manufacturers, retailers, consumers, finance and international traders). Of these, **(large) retailers, (large) food and drink manufacturers, finance and international traders were considered most influential** in shaping the behaviours, activities and choices of other actors regarding sustainability. **Consumers** can also wield significant influence when acting collectively. **Influence should go hand in hand with responsibility**, and transparency will be key. Participants recognised that other actors also have a sizeable influence (e.g. input providers (seeds, fertilisers etc.) or the hospitality sector), but time and resources available did not allow for the in-depth study of a larger number of actors.

Currently, notwithstanding negative impacts elsewhere (such as food waste), negative impacts on sustainability seem to occur to a large extent and are quite visible at the level of **primary production** (e.g. environmental impacts, because primary producers work at the interface between the environment and food production) and **consumers** (health impacts of unhealthy diets). These actors are often responding to requirements or influence from other actors in the system (especially large manufacturers and retailers) and have **relatively less individual agency**. They need to be empowered, e.g. through enabling framework conditions such as favourable food environments for consumers, or rewards for ecosystem services for primary producers.

3 The productivist paradigm emphasises the production of large amounts of inexpensive staple foods. See e.g. Gaitán-Cremaschi et al. Characterizing diversity of food systems in view of sustainability transitions. A review. *Agron. Sustain. Dev.* 39, 1 (2019). <https://doi.org/10.1007/s13593-018-0550-2>

4 Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. (1996 World Food Summit); a broader understanding of food security including agency and sustainability has been put forward by e.g. HLPE (2020), Food security and nutrition: building a global narrative towards 2030. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. <https://www.fao.org/3/ca9731en/ca9731en.pdf>

5 EU CODE OF CONDUCT ON RESPONSIBLE FOOD BUSINESS AND MARKETING PRACTICES, https://ec.europa.eu/food/system/files/2021-06/f2f_sfpd_coc_final_en.pdf

6 Definition from the Cambridge English Dictionary

Building blocks

Sustainability assessment framework

Providing a practical assessment framework is essential for any policy intending to achieve sustainability. The work presented here is a preliminary step toward developing an **evidence-based framework to assess the sustainability** of the EU food system (not of food products), including its international ramifications. Insights from the participants in the project highlighted that achieving sustainability requires the simultaneous achievement of **specific targets across all dimensions** of the framework, i.e. food security, environment, resilience, economic viability, and fair, inclusive and ethical operation, through the collective action of all actors. The discussions also stressed the importance of assessing impacts, especially environmental, from a life cycle perspective. Once a sustainability assessment framework has been agreed and made operational (i.e. a set of indicators and corresponding thresholds for sustainability), it becomes **a powerful tool for monitoring progress at the level of the food system**, which is the level that ultimately matters. On that basis, a periodic progress report (e.g. an annual Food System Report) could be envisaged, fed by a network of institutions involved in the assessment of sustainability.

Transparency in the food system

Transparency was identified as a key element for promoting sustainability. Transparency throughout the food system should facilitate **data and information exchange on sustainability criteria between all relevant actors**, i.e. not only between all businesses involved, but also with consumers and public authorities. A **transparency system** needs to be established, including **harmonised definitions, rules, methods and compatible tools**. It also needs an infrastructure (centralised or networked) and different interfaces and levels of access

tailored to the information needs of each actor. The participants in the project agreed that a transparent assessment and benchmarking process could be a first important step to take to rationalise the current dispersion and diversity in data and sources of information, as well as to address the current information gaps and asymmetries.

Dealing with the consequences of the transition

The transition to a sustainable food system will require changes in many policy fields and at several policy levels such as EU, national and local levels. The **long-term positive consequences** of a sustainable food system were clear to all participants. Nevertheless, at least in the **short-term**, specific actors (and regions) will experience **negative consequences** of the transition process that will have to **be fairly managed**. Possible consequences of transition measures need to be assessed to make sure that gains are achieved simultaneously in all dimensions of sustainability. The participants in the project proposed an **inclusive, multi-level process**, hosted (but not run) by the EU, to enable a structured, credible engagement of all stakeholders, based on sound and comprehensive evidence and allowing for new types of interactions and experimentation (e.g. living labs).

Policy coherence & multi-level governance

The purpose of a sustainable EU food system is to provide long-term food security for all of the people living in the EU, respecting people and the environment, without compromising the food security and food systems of people living outside the EU. The participants in the project highlighted that in order to drive the necessary change in the EU food system, **simultaneous and coordinated policy action across the system and across policy domains** to address problematic behaviour and interactions between

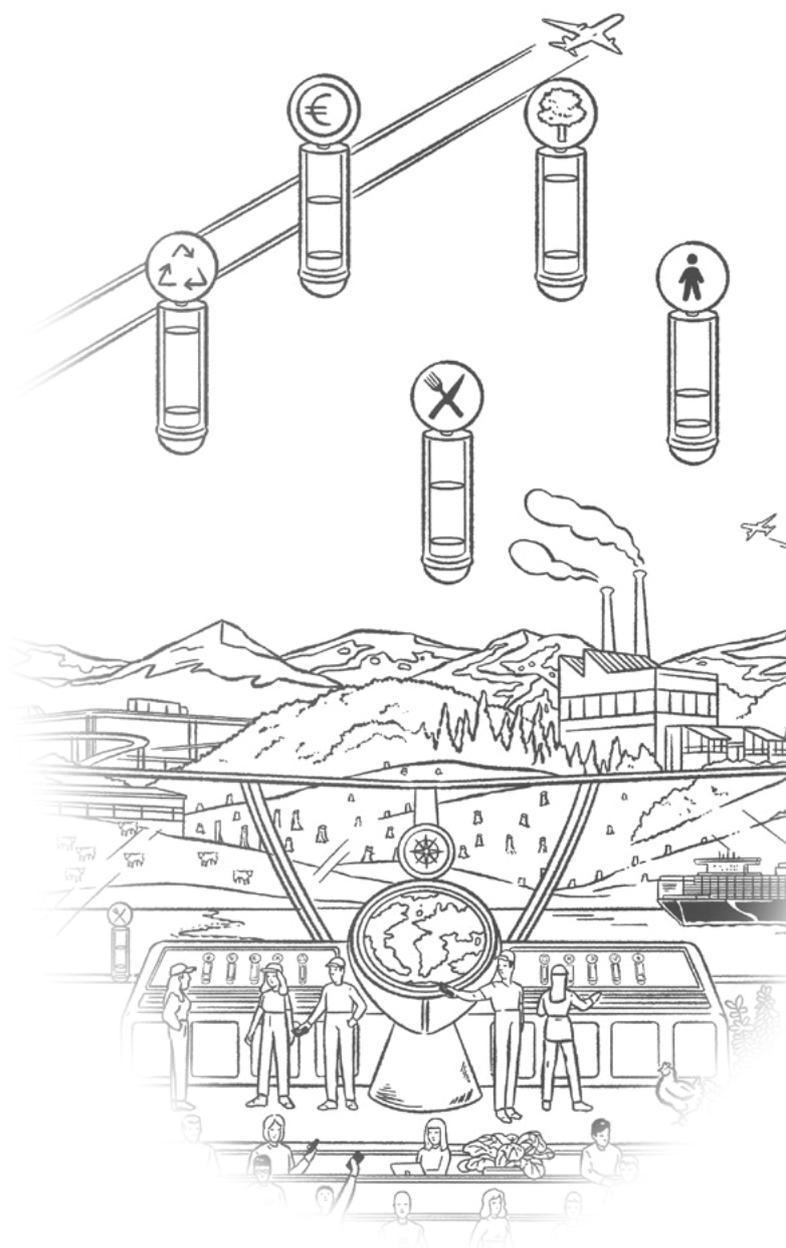
actors is needed. Coherent governance at all levels will be crucial for the implementation and appropriate institutional structures will need to be developed. No single policy will be sufficient to ensure the required system-level change.

International trade for sustainable food systems - The EU is one of the main importers and exporters of food and feed globally. The Farm to Fork Strategy clearly spells out the EU's ambition to support the '*global transition to sustainable agri-food systems*'. Its main objectives are to address the protection of global public goods ('*promoting the global transition*') and the negative effects that EU food consumption can have outside of the EU. **Sustainability standards** were considered a key element for sustainable international trade, possibly based on a further prioritisation of the selected criteria for the assessment framework. A '**multi-pronged approach**' was deemed necessary to advance. This could include World Trade Organization reform, the building of alliances and incorporation of strong sustainability standards in trade agreements, sectorial and/or unilateral approaches and building on existing forums and initiatives.

Making the EU food system sustainable

Overall, conditions need to be established that **enable consumers to play an active role** in making the EU food system sustainable and able to choose a healthy diet from sustainable sources. To that end, **enabling (physical and digital) food environments** need to be established. A healthy diet from a sustainable food system should be affordable. However, food policy should not replace social or income policies by keeping food prices artificially low. The **price of food** should reflect the conditions for sustainability and costs that are 'externalised'

today should be reflected in the price of food (true costs). Furthermore, a number of ideas for actions targeting specific actors to improve the sustainability of the EU food system have been put forward and are detailed in the chapters of this report.





1. Introduction

Food systems, worldwide and in the EU, need urgent and significant transformation to become sustainable. Food systems are responsible for about 34% of greenhouse gas emissions worldwide (of which 71% can be attributed to agriculture and land use)⁷, contributing to biodiversity loss, the depletion of fish stocks and environmental degradation. Malnutrition affects an increasing number of people, with about 9.9% of the global population facing hunger in 2020, while about 39% of the adult population is overweight or obese (in 2016)⁸. In the EU, more than half of the adult population is overweight or obese (52.7% in 2019)⁹.

The EU food system is almost unequalled in its capacity to provide a large variety of safe and high quality food, but it has a large global environmental and socio-economic footprint. In addition to environmental and health challenges, including greenhouse gas emissions, biodiversity loss and the health impacts of unhealthy diets, its economic and social implications call for change (e.g. consolidation and related power imbalances in several of its sectors, economic viability of businesses, working conditions in some food sectors)¹⁰. Furthermore, through trade, the EU food system is closely linked to and influences food systems in many other countries and regions around the world. To meet its food demand, in addition to domestic supply, the EU relies on land elsewhere¹¹ and imports more than half of the fish and seafood it consumes¹².

The European Green Deal, adopted in 2019 by the European Commission, aims to address climate change and environmental degradation, while leaving no one behind, by engaging a just and inclusive transition.

The Farm to Fork Strategy¹³, a cornerstone of the Green Deal adopted by the European Commission in May 2020, confirms the relevance of the food system for the transition¹⁴. The Farm to Fork Strategy takes a food system perspective and sets out targets and actions to move towards a 'fair, healthy and environmentally-friendly food system'. The strategy is also fully aligned with the European Union's ambition to achieve the United Nations' Sustainable Development Goals (SDGs). An Action Plan¹⁵ for the Farm to Fork Strategy sets out 27 different policy initiatives to move the food system towards more sustainability - targeting food production, food processing and retail, food consumption and food loss and waste.

A key initiative of this Action Plan, the '*proposal for a legislative framework for sustainable food systems*', aims to provide the needed legal framework to enable the currently lacking integrated system approach to food system sustainability. Furthermore, the legislative framework should help to

- accelerate and facilitate the transition;
- promote policy coherence at EU and national level;
- mainstream sustainability in all food-related

7 Crippa et al 2021 Food systems are responsible for a third of global anthropogenic GHG emissions. *Nature Food* 2, 198–209, <https://doi.org/10.1038/s43016-021-00225-9>

8 FAO, IFAD, UNICEF, WFP and WHO. 2021. *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. Rome, FAO, <https://doi.org/10.4060/cb4474en>; WHO Obesity and overweight from 9 June 2021 <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight> (accessed 7 September 2021)

9 Eurostat, Overweight and obesity - BMI statistics, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Overweight_and_obesity_-_BMI_statistics (accessed 19 October 2021)

10 See e.g. SAPEA Science for Policy Advice by Europeans Academies (2020) *A sustainable food system for the European Union* Berlin: SAPEA. <https://doi.org/10.26356/sustainablefood>; OECD (2021) *Making better policies for food systems*, OECD Publishing, Paris, <https://doi.org/10.1787/ddfba4de-en>

11 31% of the land required to meet EU food demand is located outside Europe, IPES Food 2019 *Towards a common food policy for the European Union*

12 European Commission 2020 *The EU fish market, 2020 edition*

13 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS *A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system*; COM(2020) 381 final

14 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS *The European Green Deal*; COM(2019) 640 final

15 Annex to COM(2020)381 final

- policies;
- strengthen the resilience of food systems.

Such a legislative framework, providing the basis for a food system policy targeting sustainability, would be the first of its kind (Commission proposal foreseen for 2023). It will include common definitions, general principles and requirements for a sustainable food system and food, and, as ‘the most systemically relevant action’ of the Farm to Fork Strategy, has the potential to initiate a ‘truly integrated food policy’¹⁶.

Against this background, this project ‘Concepts for a sustainable EU food system’ was initiated in December 2020 by the European Commission. The EU Policy Lab of the Commission’s Joint Research Centre (JRC) developed a participatory and system-based approach to generate strategic insights and input for the development of a legislative framework for sustainable food systems. More concretely, the purpose was to explore how an overarching legislative framework can contribute to addressing the challenges and objectives as identified in the Farm to Fork Strategy and operationalise the environmental, social and economic sustainability of the EU food system, and identify and develop possible building blocks that may contribute in the design of a future regulatory intervention. Furthermore, the process should help to further increase the understanding of how to deal with the complexity of sustainability aspects of the food system. Overall, the exercise was to be a non-binding source of collective reflections from a broad international group of people with in-depth knowledge of most aspects of the European food system.

The project focused on the EU food system, but

also considers its connections to the rest of the world. In general, the food system is understood to include all relevant actors and resources in a broad sense, and activities relevant for the production and consumption of food and beverages and their associated wastes, as well as their impact on the economy, environment and society (including health)¹⁷. In this reflection paper, the term food system is used in its singular form to reflect the EU-level perspective. However, it is understood that there is an essential territorial dimension and that the EU food system encompasses many food subsystems and cultural elements, leading to a great diversity. Furthermore, the EU food system is connected to other systems (e.g. energy, water, biosphere, healthcare). These links were not considered systematically however.

As commonly accepted, sustainability is considered here as including economic, environmental and social dimensions. This project adds some detail to this general picture, especially regarding resilience and ethics. The understanding of this concept is constantly evolving as scientific knowledge progresses and societal perceptions change. While there seems to be currently no universally agreed definition of a ‘sustainable food system’, there seems to be a broad understanding and agreement of what a sustainable food system should deliver and contribute to¹⁸. Therefore, we used for this project the recent working definition put forward in the evidence review report Nr 7 of SAPEA¹⁹:

‘A sustainable food system for the EU is one that: provides and promotes safe, nutritious and healthy food of low environmental impact for all current and future EU citizens in a manner that itself also protects and restores the natural environment and its ecosystem services, is robust

16 Schebesta & Candel 2020 Game-changing potential of the EU’s Farm to Fork Strategy. Nature Food Vol 1, <https://doi.org/10.1038/s43016-020-00166-9>

17 See also Scientific Group for the UN Food Systems Summit (2021) Food Systems – Definition, Concept and Application for the UN Food Systems Summit, https://sc-fss2021.org/wp-content/uploads/2021/06/Food_Systems_Definition.pdf

18 Several definitions exist, reflecting different viewpoints and interests (see European Commission, Group of Chief Scientific Advisors 2020, Towards a Sustainable Food System)

19 SAPEA, Science Advice for Policy by European Academies 2020, A sustainable food system for the European Union. P. 68

and resilient, economically dynamic, just and fair, and socially acceptable and inclusive. It does so without compromising the availability of nutritious and healthy food for people living outside the EU, nor impairing their natural environment.'

A participatory process that ran between March and June 2021, involving 44 knowledgeable participants, was at the core of this project (see Chapter 2 and Annex 1 for more information about this process and the participants). The reflection paper presents the synthesis of multiple conversations held throughout the process and is based on the integration of opinions put forward by the participants. Due to the breadth of the topic and the time limitation of the process, not all aspects of the food system could receive equal attention. Most aspects are already covered extensively elsewhere (e.g. food waste) and some could be considered in follow-up work (e.g. role of novel foods and new technologies, zoonoses²⁰ and use of antibiotics, the growing importance of the food service sector). Additionally, due to time constraints, participants did not consider governance levels (e.g. EU, national, local) at which possible specific actions towards sustainability should take place, or if the EU would have the relevant competences to act. While the authors took care to do justice to the wealth of input provided, and all participants had the possibility to comment on two consecutive drafts of this reflection paper, the authors remain responsible for any remaining misrepresentation of the input.

The remainder of this reflection paper is structured as follows:

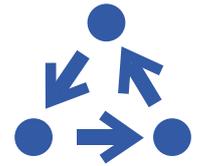
- Chapter 2 provides a brief description of the participatory system approach, i.e. the process.
- Chapter 3 presents the key actors of the food system and information about current unsustainable behaviours and underlying drivers.
- Chapter 4 outlines the five different building

blocks, (i.e. detail about the five relevant elements for a legislative framework): the sustainability assessment framework, transparency, consequences of the transition, policy coherence and multi-level governance, and international trade.

- Chapter 5 presents an illustration of working together towards a sustainable food system.
- Chapter 6 presents overarching and targeted policy measures to foster sustainability of the food system.
- Chapter 7 presents the overall conclusions.
- The Annexes contain additional material such as the list of participants, details for the sustainability assessment framework, a list of Farm to Fork related policy actions and references.

²⁰ Zoonotic diseases are those that spread between animals and humans, such as zoonotic influenza, West Nile fever and rabies.

2. Process



The EU food system is inherently complex. Bringing in multiple perspectives is necessary to stimulate cross-cutting conversations and to build solid collective intelligence. This is why a participatory approach was chosen to generate conceptual building blocks to feed into the discussions about the design of a ‘legislative framework for sustainable food systems’.

The tailor-made methodology applied in this project was inspired by the system thinking approach of Donella Meadows²¹. For introducing change effectively into a system, relevant leverage points need to be identified (i.e. places for effective intervention) and their interconnections made explicit. Because a lot of work has already been done regarding what needs to be changed to make the EU food system sustainable, the focus of this project’s approach was put on ‘how’ change could be fostered. This meant identifying the relevant actors as leverage points, defining their relations and exploring the conditions that would be needed for their behaviour to change towards more sustainability. The combination of a system approach and a collective intelligence process allowed conversations to move through different scales, mixed levels of granularity and deeper levels of inquiry.

The participatory process applied in this project was designed to generate collective intelligence from an inclusive group of 44 participants from academia, business, civil society organisations, policy, EU agencies and international organisations, with in-depth knowledge and expertise covering most aspects of the food system. In addition to their extensive knowledge and expertise about the food system, these people were selected paying attention to gender and geographical balance (see Annex 1 for the full list of participants). Other Commission departments (Health and Food Safety, Agriculture and Rural Development, Maritime Affairs and

Fisheries, Environment, Research & Innovation) followed the discussions and provided additional factual input as needed, including information about current and forthcoming EU legislation and initiatives in relation to sustainability and the Farm to Fork Strategy. The JRC designed the process and facilitated the meetings, drawing on its expertise in systems thinking, complexity and the food system.

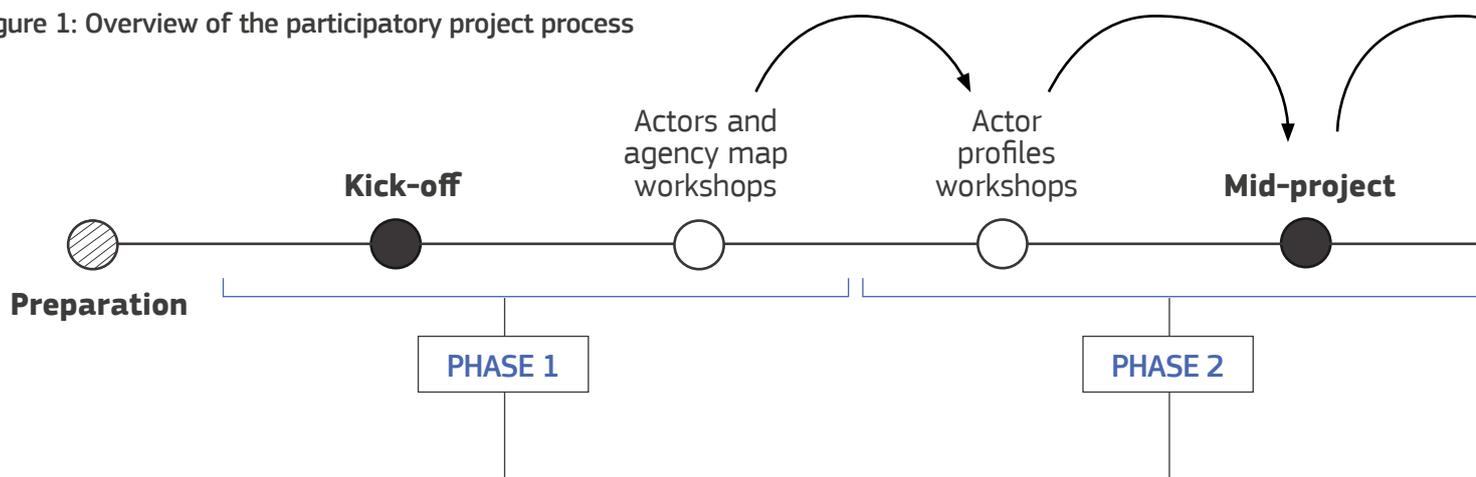
The work had to be performed using online participatory workshop formats over 14 weeks between March 9 and June 24, 2021. The online setting brought the constraints of having to keep sessions short (3 hours maximum) and having to combine plenary meetings with smaller working sessions to ensure meaningful conversations. This translated into a high number of workshops held within the 14 weeks of the process: 30 small group sessions with 8-12 participants, and three plenary sessions. To make the most of these sessions, the JRC study team ensured that each meeting built on the previous one.

Structure of the participatory process

The participatory process consisted of three phases (Figure 1). The first phase aimed at creating common ground amongst the participants by defining the food system in terms of the relevant actors. Phase 2 focussed on better understanding the underlying motives for actors’ sustainability-related behaviours. Based on this shared understanding, the issues relevant for the sustainability transformation of the food system were identified and explored in Phase 3. The steps are described in more detail below.

²¹ Meadows D., *Leverage Points: Places to Intervene in a System*, The Sustainability Institute, 1999.

Figure 1: Overview of the participatory project process



PHASE 1: SYSTEM MAPPING

The first phase, initiated during the kick-off plenary meeting, aimed to create a shared understanding and representation of the human actors involved in the food system. This led to the creation of a detailed actor map of the overall food system (see Figure 2, and further explanation in Chapter 3) as well as a preliminary identification of relationships between actors. Once the boundaries of the system were revealed, attention was given to the most important actors of the food system in terms of their influence on the behaviour of others with respect to sustainability.

This led to the co-creation of an ‘agency map’ highlighting the actors and relationships most relevant for shaping the sustainability of the EU food system (see Table 1, Figure 3, and their discussion in Chapter 3). The aim at this stage was to comprehend the dynamics of the system and the flow of influence amongst the main actors. These actors were seen as potential leverage points on which to intervene and apply policy action to change their behaviour and move the system towards sustainability.

This agency map, focusing on fewer actors and on interlinkages, allowed for a more manageable, synthetic and dynamic view of the EU food system. While discussions produced insights on sustainability-related behaviours, roles and responsibilities of a still broad range of actors (13 actor groups), some emerged as being particularly significant in the current food system.

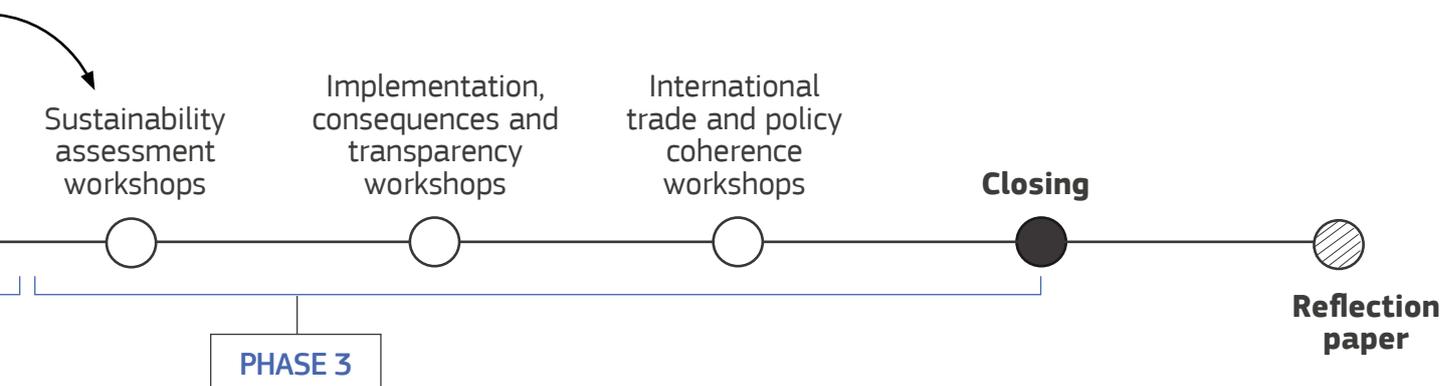
PHASE 2: SUSTAINABILITY DRIVERS AND ENABLERS

At this point in the process, all participants had contributed to a shared in-depth understanding of the key dynamics, constraints and drivers for sustainability in the EU food system, as well as roles and responsibilities of the key actors.

Building on the shared understanding of the motives underlying the current sustainability-related practices in the food system and in the frame of the EU policy perspective, Phase 2 focused on the six actors deemed by participants to be the most relevant for the sustainability of the food system: EU primary producers, food and drink manufacturers, retailers, consumers, finance actors and international traders. Each of these actors were further analysed in order to understand both the drivers of their current sustainability-related behaviours and the enablers that could encourage them to stop unsustainable activities.

To stimulate these discussions and analyses further, a short and thought-provoking video on science fiction and food, specifically produced for the project, was presented to the participants at the mid-project plenary meeting. The narrative and images in the video immersed the audience in a world where there is a range of alternative ways of producing and consuming food.

The discussions among the participants during Phase 1 and Phase 2 provided a basis upon which to identify what building blocks could be essential in the context of developing a comprehensive regulatory intervention. For each of the six actors, participants identified relevant changes that would be needed to foster sustainable behaviour. Collecting and clustering these ‘enablers’ across the different actors led to the emergence of five building blocks agreed by all participants. These are: sustainability assessment, transparency, consequences of the transition, policy coherence, and the international dimension of the EU food system. These five topics and practical implementation of policy were discussed in greater depth during Phase 3.



PHASE 3: BUILDING BLOCKS FOR A LEGISLATIVE FRAMEWORK AND POLICY IMPLEMENTATION

In Phase 3, the building blocks were discussed in more detail. The first building block is the sustainability assessment framework. Sustainability assessment i.e. assessing the level of sustainability of the food system, was deemed fundamental and was the starting point for the discussions involving all participants. The other four building blocks (i.e. transparency, consequences of the transition, policy coherence, and the international dimension of the EU food system), as well as practical implementation of policy were discussed in at least two small group sessions each (i.e. ca. 16 participants). Because of overall time constraints, they could not be discussed with all participants, but the summaries of the discussions were made available to all for comments.

BUILDING BLOCK 1: SUSTAINABILITY ASSESSMENT

How can we assess sustainability? A first draft of a multi-dimensional assessment framework was created through a series of six online working sessions. This draft was then subjected to a collective prioritisation exercise, to rank and to reduce the number of criteria to those deemed the most relevant. This draft was then reviewed and commented on 'off-line' (see Section 4.1 and Annexes 2 and 3).

BUILDING BLOCK 2: TRANSPARENCY

Transparency emerged as an important principle to promote sustainability and facilitate data and information exchange on sustainability criteria between relevant actors (business-to-business (B2B); business-to-consumer (B2C) and business to public authorities). The discussions used the agency map to visualize the flows of information across the food system (see Section 4.2).

BUILDING BLOCK 3: CONSEQUENCES OF THE TRANSITION

The transition of the food system to sustainability is expected to have in the short-term negative consequences for some actors, while in the longer term positive consequences for all are expected to prevail. The discussions on this topic focussed on defining a suitable process to manage possible short-term negative consequences of the transition process (see Section 4.3).

BUILDING BLOCK 4: POLICY COHERENCE

Policy coherence is a key issue to accompany the transition of the EU food system towards sustainability. This relates to the fact that the EU food system interacts directly with many policy areas. There is a significant potential for various policies to work against each other (unintentionally), as well as to work in synergy with one another in relation to food (which ideally would be supported). The conversations on this topic were made more tangible by focusing on a specific topic upon which to draw the main elements for policy coherence (see Section 4.4).

BUILDING BLOCK 5: INTERNATIONAL DIMENSION

The EU food system is integrated in global trade, therefore it is important to analyse how sustainability and related EU choices could affect the rest of the world, and vice versa. In order to structure and facilitate discussions on this topic, the agency map was enlarged to bring in international trade actors (see Section 4.5).

POLICY IMPLEMENTATION

The objective was to harvest ideas about how the Commission could best facilitate the implementation of a legislative framework for sustainable food systems. Several sessions were dedicated to reflections on possible actions to support the transition (see Chapter 6).

A final plenary session was held with all of the participants to share and discuss the results of all of the discussions. This session also engaged the participants in answering a set of 'What if?' questions, to develop further the systemic understanding of the desired future evolutions of the EU food system.

REVIEW OF DRAFT VERSIONS OF THE REFLECTION PAPER BY THE PARTICIPANTS

This reflection paper was written on the basis of the participatory process and represents a compilation of inputs provided by the participants. Two subsequent drafts have been circulated for comments to all participants. The first draft was distributed in July 2021. The second draft, building on and incorporating the comments received, was distributed in September 2021. The present report is the result of this second review. The results of the conversations are presented in the following chapters.

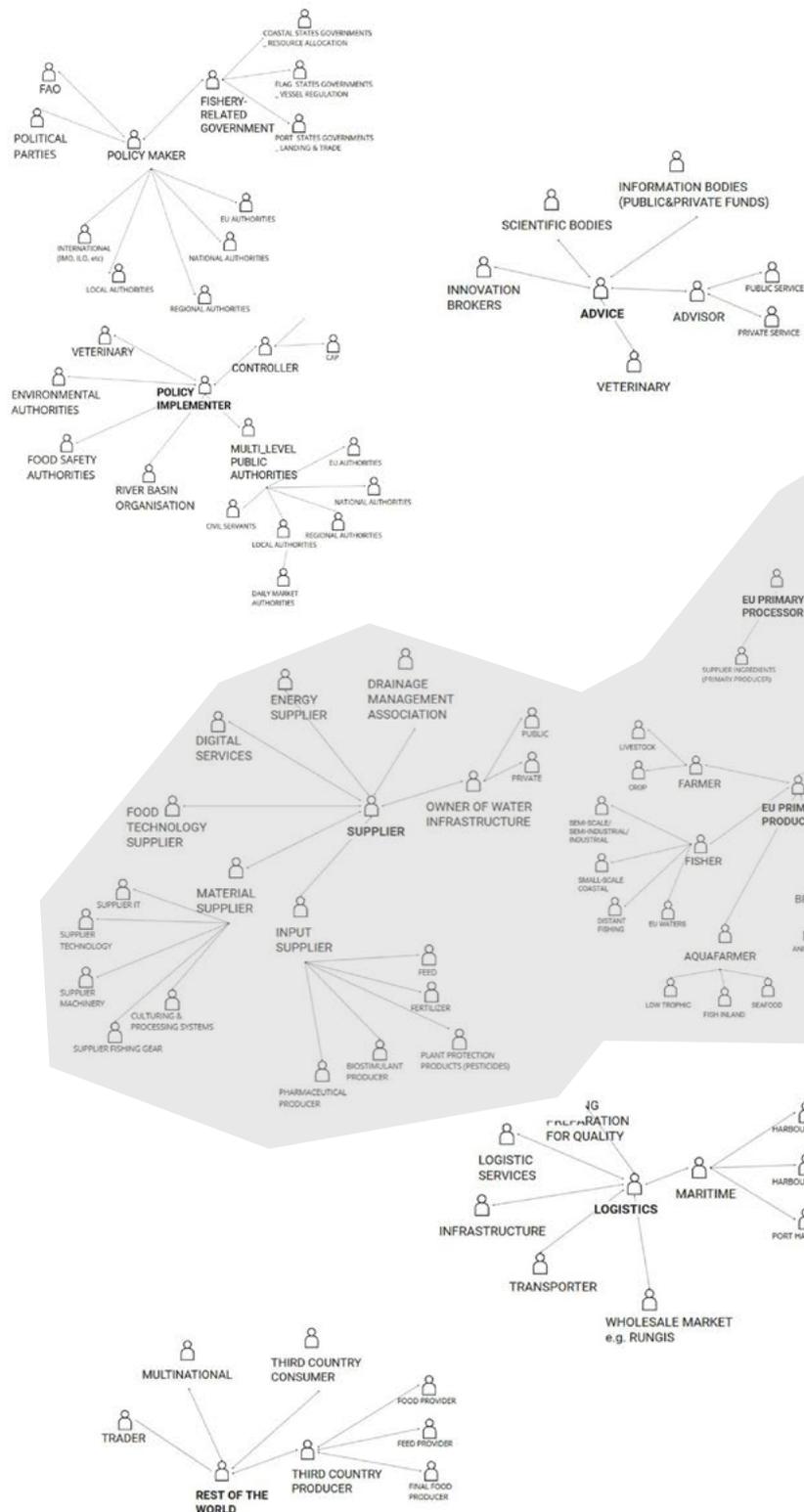
3. Key actors in the EU food system



Delivering food to all EU citizens requires human action. The actors of the food system, as potential agents of change, are critical points for targeted policy interventions to support change and the evolution of the system. From this perspective, the first step to understand how policy can support the transition towards a sustainable food system, was to describe the actors that compose today's EU food system.

The conversations to create a comprehensive map of the EU food system built on the traditional food supply chain representation of actors (Figure 2). This map identifies 25 broad groups of actors, ranging from input suppliers and the various types of primary producers all the way to the consumers. Manufacturing and retail are considered with all their intermediaries too, both inside and outside of the EU. The map also covers actors such as those involved in research, certification, finance, education, and many other sectors that have a direct link to the EU food system.

Beyond making sense of all the actors involved in the EU food system, participants were asked to consider their agency, i.e. their freedom and 'ability to take action, or to choose what action to take'²², on the working and sustainability of the food system. The iterative conversations throughout several workshop sessions allowed to build a simplified map of the system, highlighting the relationships between the actors that were most relevant for sustainability, the so-called *EU food system agency map* (Figure 3). This map helps to better understand the actors considered the most influential in shaping the behaviours (activities and choices) of the other actors with respect to sustainability. Table 1 provides an overview of actor groups included in the EU food system agency map and the actor groups they influence.



22 Definition from the Cambridge English Dictionary

Figure 2: Representation of the actor groups of the EU food system



FOOD SUPPLY CHAIN

While the actors were clearly recognised as being at the core of the operation and evolution of the food system, the discussions also brought to the fore fundamental constraints that these actors have to face in relation to the use of natural resources and of physical space. Also embedded in the food system are the social and economic dimensions. When dealing with the sustainability of the food system, all these aspects have to be considered simultaneously in a coherent frame. One way to do it, as suggested in some conversations along the project, is to consider the nine planetary boundaries and the 12 social foundations brought together in the ‘doughnut economics’ framework²³. This could allow for the inclusion of consumers, and in a wider sense, and with a different function in society, all of the relevant people, whether as citizens, inhabitants or other categories.

Generating a deeper understanding of the barriers to and enablers of sustainability required the development of a more refined picture of the drivers and constraints affecting each of the actors. In view of the time limits of the project, efforts focused on a manageable sub-set of the key actors considered the most relevant through a collective assessment. Their characteristics and their most significant structuring relationships for sustainability were explored more in depth to reveal their potential to trigger system change. As a result, the complexity of the food system was examined through the lens of the six groups of actors: primary producers, food & drink manufacturers, retailers, consumers, financial actors and international trade actors. These six groups of actors were the subjects of in-depth brainstorming to identify what prevents them from operating sustainably (and therefore should be the object of policy measures), notwithstanding current efforts to progress towards sustainability.

Table 1: Actor groups of the EU food system agency map

Actor groups	Main influence towards other actor groups
 Input Supplier	EU Primary Producer
 Intermediary	EU Primary Producer, Catering services & hospitality
 EU Primary producer	Consumer, Input supplier
 Food & drink manufacturer	EU Primary Producer, Retailer, Consumer, Intermediary, Rest of the world
 Retailer	EU Primary Producer, Food & drink manufacturer, Consumer, Intermediary, Rest of the world
 Catering Services & Hospitality	EU Primary Producer, Consumer
 Consumer	EU Primary producer, Retailer
 Finance	EU Primary Producer, Food & drink manufacturer, Retailer
 Advice	EU Primary Producer, Food & drink manufacturer
 Interest groups	Retailer, Consumer
 Media	Consumer
 Rest of the world	Input supplier, Retailer
 Policy maker	All actors

²³ The ‘planetary boundaries’ is a concept developed by Johan Rockström, Stockholm Resilience Centre, and 28 renowned scientists. They represent the nine processes responsible for the stability and resilience of the Earth system. Respective safe operating spaces/boundaries have been defined. The nine processes include climate change, novel (chemical) entities, stratospheric ozone depletion, atmospheric aerosol loading, ocean acidification, biogeochemical flows, freshwater use, land system change, biosphere integrity (see <https://www.stockholmresilience.org/research/planetary-boundaries/the-nine-planetary-boundaries.html>). The concept of doughnut economics complements the planetary boundaries with a ‘social foundation’ including 12 aspects considered essential for every human being (such as food, housing, income and work, social equity) (see <https://doughnuteconomics.org/about-doughnut-economics>)

The elements listed in the following subsections present the results of this brainstorming process. The aspects included in the lists do not necessarily imply an intentional unsustainable behaviour.

Primary Producer

Primary producers are widely regarded as one of the groups of actors that can make the largest direct impact on environmental sustainability (as ‘managers of natural resources’). Subject to many strong and simultaneous pressures and supporting initiatives (e.g. demand from retailers and consumers, subsidies and constraints from e.g. local access to inputs and resources, agricultural and fisheries policies, etc.), the primary producer mostly appears to be willing to progress towards sustainability. Some programmes exist to support this, but there is still a lack of support and space to progress towards sustainability. Furthermore, primary producers also need to be profitable, while being mostly ‘price takers’. Hence, they are largely influenced by socio-economic factors. At the same time they also have to ensure compliance with food safety. Both of these aspects are considered as such being beyond their direct control. In addition, their attitude towards sustainable practices and related changes plays a role. Well-designed policies are needed to support sustainable primary production and further increase their responsiveness.

Main aspects of current activities that still compromise sustainability (farming, aquaculture and fishing)

- Crop farming practices that contribute to greenhouse gas emissions and that have negative environmental impacts on soil health, biodiversity, water abstraction, crop diversity, surface and groundwater (contamination from fertilizers and plant protection products).
- Intensive livestock and aquaculture production (incl. reliance on highly productive

breeds, disregarding local adapted breeds), and dependency on imports of feed with high environmental impact, including deforestation.

- Crop destruction and waste - when processing requirements make it unaffordable to harvest.
- The average income (lower than EU average income) and social security of farmers and fishers, age structure (‘greying’) of farmers and fishers (loss of traditional know-how and diversity, shrinking rural populations).
- Working conditions, in particular the reliance on and treatment of seasonal and migrant workers.
- Overfishing outside and inside the EU
- Fisheries that use sea-bottom fishing gears (i.e. traditional bottom trawl gear) which are often non-selective and/or habitat destructive, and show a high consumption of fossil fuels compared to those using pelagic fishing gears (targeting fish in the mid- and surface water).
- Aquaculture feed based on unsustainably produced inputs (e.g. unsustainable wild capture) and/or excessive feed quantity, which harms the environment.
- Extension services and knowledge transfer in agriculture often provided by large corporations.

Drivers of current behaviour that still compromises sustainability (farming, aquaculture and fishing)

- Market pressure and pricing signals leading to food prices that do not reflect the ‘true cost’ of food production, i.e. the environmental externalities are not factored at the right level into the final price of food.
- Trade-off between efficiency and resilience – raise productivity (e.g. through technology change) to increase income and volume possibly at the expense of sustainability and resilience. Furthermore, this leads to structural change, less farms and lower food prices in the longer run, putting farmers with

low incomes under pressure and inviting overexploitation of resources.

- Current structure of subsidies for farming – the main part is aimed at supporting farming economically; environmental goals are still not strong enough and unsustainable practices are not penalised enough yet.
- Farmer household net incomes are often too low to enable investment in sustainability.
- Insufficient incentives in the common agricultural policy (CAP) in favour of regenerative agricultural practices: the focus is on respecting a catalogue of environmental practices (checklist approach) to receive subsidies rather than incentives based on measurable positive impact (carbon stored in soils etc.) that would require tailored interventions.
- Insufficient quantities of quality crop seeds and of varieties that have a market (cash crops and under-utilised crops).
- Unpredictable price volatility.
- Absence of a regulated carbon market or certification schemes for agriculture to reward farmers for the ecosystem services they provide.
- Lack of independent extension services, such as those that provide advice on how to improve environmental performance, insufficient research, agronomy training and other support to help farmers move to regenerative agricultural practices that lead to measurable positive impacts.
- Lack of agricultural support services and de-risking approaches to support ‘green agri-preneurship’.

- Standardisation introduced to keep costs low is leading to a lack of diversity (e.g. policies focusing on export competitiveness push for uniform farming, and strict criteria (e.g. size of vegetables) push for homogeneity).
- National and regional land tenure and ownership rules; lack of regulated ‘land use’ market to incentivise adoption of regenerative agricultural practices.
- Product requirements (e.g. quality standards) and contractual conditions set by manufacturers and retailers.
- Consumer preferences and demand for low-cost food, year-round availability and certain animal parts/products/animal-sourced protein, promoted by the food environment²⁴.
- Fishers do not own fishing grounds, thus in some cases local fishers cannot exclude the highly mobile industrial vessels from their waters and local resources risk being ‘plundered’, while the more resident artisanal fisheries tend to be more respectful of the resource.
- Difficulty of controlling activities at sea.

Food & Drink Manufacturer

The food & drink manufacturers are considered to be very influential actors in the food system. They are less consolidated than the retail sector (about 99% of the 291,000 food & drink manufacturers in the EU are small and medium-sized enterprises²⁵), but there are a few very large actors. This sector influences primary producers through contractual requirements and conditions, combined with their ability to source globally. Manufacturers’ role in

²⁴ Food environment is understood to include physical and digital dimensions. The physical food environment is defined as the ‘physical, economic, political and socio-cultural contexts in which people engage with the food system to make their decisions about acquiring, preparing and consuming food.’ (see <https://epha.org/what-are-food-environments/>). The digital food environment refers to ‘the online settings through which flows of services and information that influence people’s food and nutrition choices and behaviour are directed. They encompass a range of elements, including social media, digital health promotion interventions, digital food marketing and online food retail.’ (see WHO (2021) Factsheet Digital Food Environments <https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/publications/2021/digital-food-environments-factsheet-2021>).

²⁵ Food Drink Europe (2020) Data & Trends EU Food & Drink Industry 2020 Edition. <https://www.fooddrinkurope.eu/wp-content/uploads/2021/02/FoodDrinkEurope-Data-Trends-2020-digital.pdf>

defining the composition of food items, and their promotion efforts, influence consumers' diets.

Main aspects of current activities that still compromise sustainability

- Sourcing raw materials from unsustainable chains.
- Unsustainable aspects of manufacturing (e.g. design of products leading to unsustainable practices, ingredients or processes leading to unsustainable behaviour such as unhealthy diets, e.g. over-consumption of highly appetizing foods high in sugar, salt and saturated fat, so-called ultra-processed foods²⁶).
- Packaging (non-recyclable material, limited access to high quality recycled material to increase recycled content of packaging, excess packaging).
- Inappropriate advertising of foods high in sugar, salt and saturated fat, in particular to children and adolescents, and of so-called ultra-processed foods, promoting unhealthy diets.
- Resource and fossil fuel intensive transport & logistics.
- Energy use (electricity & heat): unsustainable sources, inefficiency in energy use.
- Standards and conditions for the suppliers (e.g. primary producers), including type of contracts, incentivising unsustainable practices (e.g. less favourable working conditions, low wages, intensification).
- Labour contracts and employment standards negatively affecting the quality of life of

workers; poor worker housing standards.

- Food and other waste.

Drivers of current behaviour that still compromises sustainability

- Current common paradigm that the food has to be inexpensive and the companies do not have to internalise important external costs (e.g. regarding health and environmental impacts, animal welfare).
- Pressure from retailers – reinforced by cross-border European retail alliances – to reduce costs and product prices (with impacts on activity of manufacturers and primary producers).
- Short-term profit maximisation is still the dominant objective, to the detriment of the other dimensions of sustainability, in spite of some changes.
- Lack of transparency regarding suppliers' practices (social and environmental key performance indicators) regarding the supply of raw materials.
- Standardisation of ingredients (the diversity of crops has become too limited) and demand for year-round availability of all types of food, which has a major influence on supply chains.
- Agriculture and trade policies can sometimes influence the sourcing of ingredients (e.g. through specific subsidies, quotas, tariffs or preferential trade deals).
- Shareholders' and investors' demands for (short-term) financial returns.

²⁶ The term 'ultra-processed food' has been mentioned many times throughout this project and has generated discussions. As a result, it is necessary to clarify why a choice was made to keep this term in this reflection paper.

The term 'ultra-processed food' is being used but is not precisely defined and currently contentious. In this context the term 'processed foods of complex composition' has been suggested to capture not just the degree of processing but also the composition of the food (Report of the Scientific Committee of the Spanish Agency for Food Safety and Nutrition (AESAN) on the Impact of consumption of ultra-processed foods on the health of consumers (2020) https://www.aesan.gob.es/AECOSAN/docs/documentos/seguridad_alimentaria/evaluacion_riesgos/informes_comite/ULTRAPROCESADOS.pdf).

Still, there is increasing scientific evidence suggesting a link between so-called 'ultra-processed foods' and detrimental health outcomes beyond the presence of high levels of salt, sugars, fat. In particular, evidence is emerging that the palatability and increasing speed of ingesting calories that this type of foods makes possible can lead to overeating (see Elizabeth et al (2020) Ultra-processed foods and health outcomes – A narrative review, *Nutrients*, 12(7), <https://doi.org/10.3390/nu12071955> ; and Percival (2021) Ultra-processing is the new frontier in public health policy—reflections on the National Food Strategy, <https://blogs.bmj.com/bmj/2021/07/15/ultra-processing-is-the-new-frontier-in-public-health-policy-reflections-on-the-national-food-strategy>).

While there is no agreement on a definition across the EU so far, the term 'ultra-processed foods' is starting to be explicitly mentioned in national policies of some EU countries (e.g. France, Belgium). As it seems that a range of foods meant to offer vegetarian alternatives and to replace animal-sourced foods with plant based alternatives result in highly processed products reaching supermarket shelves, it was felt that the issue could not be eliminated from this discussion.

- Societal trends: changes of lifestyles and household structures, less time spent on cooking compared to previous generations, societal demand and lifestyle-related preference for quick and easy to prepare food opening opportunities for so-called ultra-processed foods, lack of food literacy.
- Lack of enabling conditions to support the transition to sustainable food systems e.g. technologies, primary and secondary raw materials, infrastructure, energy supply, enabling policy frameworks, financial support mechanisms/incentives.
- Still insufficient consumer awareness and demand for products from sustainable production chains, often due to insufficient income and knowledge.
- Consolidation and upscaling of logistics making competition hard for small companies (path dependency).

Retailer



The retailers and cross-border retail alliances of sometimes competing retailers appear as gatekeepers between the primary producers, manufacturers and consumers. Their degree of consolidation gives them substantial market power. They are also strong influencers of primary production and manufacturing practices through contractual requirements and production of their own private label products, in which cases they have a double role and act as food and drink manufacturers as well. They also strongly influence consumer food choices through the food they offer, how it is displayed and promotions. Retailers hold a wealth of data about consumers and consumption patterns that is often not made available for research and policy-making.

Main aspects of current activities that still compromise sustainability

- Promotions, discounts and marketing (online, offline, media and in-shop) of products that do not come from sustainable supply chains, placement of products with a high environmental, health and/or social footprint, such as for example foods sometimes considered to be ultra-processed and foods high in sugar, salt and fat.
- Employment conditions.
- Management of food surplus and food waste (also relevant for other actors).
- Packaging of products and packaging for logistics.
- Sourcing of products from unsustainable supply chains and price pressures on primary producers.
- Inefficient and fossil-fuel based transport and logistics (especially air freight).
- Placement of shops (requiring a car for access leading to more greenhouse gas emissions for transport).
- Contractual conditions for suppliers including primary producers.
- Inadequate provision of education and structured information to consumers regarding sustainability.

Drivers of current behaviour that still compromises sustainability

- Dominance of economic profit over the other dimensions of sustainability.
- Market power of retailers (highly consolidated sector).
- Lack of incentives to route a fair share of profits back to primary producers.
- Competition between retailers mostly focused on consumer prices.
- Logistics, convenience, marketing, food safety and sometimes food waste concerns can lead to excessive packaging.

- Consumer demand for low-cost, convenient food.
- Uneven availability and implementation of reliable sustainability standards and reporting frameworks.
- Pressure from profit seeking on the retailers to offer large choices of the same product, leading to more food waste.

Consumer



Consumers are the most numerous actors in the food system. Their individual agency is low and their specific food environments²⁴ (which are often not supportive of healthy diets from a sustainable food system) play an important role, among other factors, for their behaviour. However, collectively consumers have considerable influence on changes in the food system. Their decisions can delay or inhibit the adoption of new products and new technologies. Likewise, dietary change among large groups of consumers can be a strong lever for sustainability. Introducing an appropriate mix of measures to change food environments, including food education, can create enabling conditions for the uptake of healthy diets from a sustainable food system. It can generate strong incentives for retailers and other supply chain actors to evolve their practices and business models. EU consumers are currently used to comparatively low food prices and year-round availability of all types of food. Apart from a lack of easy access to components of a healthy diet from a sustainable food system and issues of affordability for some groups, the lack of information and food literacy²⁷ as well as lifestyle choices, influenced among others by socio-cultural factors, and food marketing and promotion, can inhibit sustainable dietary choices among many EU consumers.

Main aspects of current activities that still compromise sustainability

- Unhealthy diets with too high a share of nutritionally challenging food and beverages (with high levels of salt, sugar and saturated fats, so-called 'ultra-processed foods'), overconsumption.
- Preference for certain traditional diets with high fat, meat and dairy even when lifestyle factors no longer make this a healthy choice.
- Insufficient consumption of health-promoting foods, such as fruits and vegetables, whole grains, legumes, nuts and water.
- Purchase of foods from unsustainable supply chains (e.g. from supply chains with a large environmental footprint - high share of animal products in diets, long distance transport, production processes with excessive resource, water, energy and land use, pesticides & fertilizers).
- Purchase of foods produced under ethically problematic conditions (including animal welfare).
- Preference for abundant choice and low prices, convenience with little time spent choosing and cooking food (drives inefficiency in the system and the consumption of convenience/ready-made (processed) food).
- Deficiencies in food literacy leading to less healthy diets and more food waste.
- Purchase of food with excess and/or non-reusable or -recyclable packaging (including plastic).
- Food waste at household level.
- Means of transport for food shopping (e.g. driving far).
- Way of cooking - preparing food with high consumption of energy.

Drivers of current behaviour that still compromises sustainability

²⁷ Food literacy in this document is defined as the necessary knowledge and skills for a healthy food choice and diet from a sustainable food system.

- Food environments (offline and online), in particular shopping opportunities (e.g. markets, supermarkets, community-supported agriculture, distance/mobility), choice environment (product placement, special offers, packaging size, choices available), exposure to marketing of foods associated with unhealthy and unsustainable diets.
- Low food price and taste are the main purchasing drivers (prices do not promote sustainable choices as they do not include all external costs).
- Social inequalities and low income.
- Lifestyles and working conditions/hours – little time available for purchasing food and preparing and eating meals, increasingly small households and increasing ‘on-the-go’ consumption.
- Lack of awareness, knowledge and capacity to make sustainable food choices (lack of information on the impact of food choices and depletion of resources, lack of food literacy incl. misperception of labels, misinformation offline and online).
- Expectation of year-round availability of diverse affordable food from around the world.
- Quality/cosmetic standards for fruit and vegetables and other foodstuffs (both relevant for production and consumer choice).

Finance

Recently, the EU has been working to improve the sustainability profile of investments through initiatives such as EU Sustainable Finance, EU taxonomy for sustainable activities, and so on. However, the non-economic dimensions of sustainability do not seem to have yet been

strongly considered by financial actors regarding for example, investments and loans in the food system. Short-term financial gains often take priority for shareholders and banks, potentially undermining innovative approaches and companies’ efforts to become sustainable. Recent examples of shareholder influence on sustainability agendas of large food manufacturers emphasise the importance of the financial sector for the food system²⁸.

Main aspects of current activities that still compromise sustainability

- Environmental and social sustainability considerations remain secondary to profit considerations in investment advice. Loans are agreed for environmentally harmful practices (harmful to soils, biodiversity and marine environment, e.g. favouring productivity, use of fertilizers/pesticides, building of large fishing vessels).
- Historical lack of credible and globally recognised Environmental, Social and Governance (ESG) investment criteria (progress is being made at least at EU level).
- Shareholders are demanding a return on equity, rather than environmental and social sustainability.
- Financial dealings on food markets leading to price hikes.
- Lack of financing for innovative sustainable activities that can be economically risky. There is little risk capital (angel capital, venture capital) available to support new innovating actors.
- The focus of investment decisions on cash flow/return on investment (Basel IV) disincentivises the financing of sustainable actions (e.g. land purchases to make farming less intensive, but by doing so, making it more

²⁸ ee for example ‘The fall from favour of Danone’s purpose-driven chief’, Financial Times 17 March 2021 <https://www.ft.com/content/2a768b96-69c6-42b7-8617-b3be606d6625>

capital intensive); financing of food system actors without taking into consideration ESG criteria.

- Insurance products are designed without proper incentives to reduce environmental and social impacts.

Drivers of current behaviour that still compromises sustainability

- Economic pressure creating a mind-set focused on economic profit.
- Short-term thinking – short-term profit maximising.
- Free movement of capital.
- Low product prices and respective potential income determine loans. There is a lack of good data on business models and earning capacity benchmarks of farms and food businesses that are ‘non-standard’ (such as nature-based, or multifunctional farms).
- Food seen as a marketable commodity only, and not as a public or common good, or a right.
- Externalities not internalised in the price of food (true cost of food).
- Lack of harmonised reporting requirements for sustainability information.
- Compliance with financial regulations that do not consider sustainability (e.g. bank solvency)
- Banks become global (loss of informal trust - disconnection from local contexts).

International Trader



The EU is one the main importers and exporters of food and feed in the world, and international supply and demand influences food production and what is on offer in the EU. While economic drivers such as international competition currently prevail and reliance on mostly inexpensive transport has been strong for decades, trade can have a positive but

also negative influence on sustainability in all its dimensions, both in the EU and in third countries.

Main aspects of current activities that still compromise sustainability

- Use of fossil fuels for transport (especially airborne transport) along the value chain, including transport of intermediates for transformation (between production and selling).
- Long-distance transport of livestock, leading to animal welfare issues.
- There exists the potential for imports that are produced according to lower sustainability targets to compete on EU markets with EU products produced according to higher targets: this can inhibit the introduction of higher sustainability standards/targets in the EU (via commercial and political pressure).
- Non-transparent choices of products and suppliers – e.g. imported soy as the primary protein source, imported fish from unsustainable stocks or deriving from unsustainable fishing practices.
- Creation of markets outside of sustainability standards and verification - direct interface between primary producers (sellers) and buyers.
- Concentration of trade from few sources and/or using few channels in a few entry ports can lead to inefficient distribution logistics.
- Poor working conditions and slavery outside of EU control (e.g. on some fishing vessels, in some plantations, in processing facilities and so on).
- Inhibition of innovation at the local level, e.g. encouraging mono-crop production for export, which causes severe environmental damage, with no diversification and the loss of traditional cropping systems, as well as cultural heritage in the producing countries and regions.

Drivers of current behaviour that still compromises sustainability

- Prevalence of production-oriented paradigm – food security through sufficient food quantity.
- Globalisation of markets, offering choice to buyers and sellers.
- Dominance of market demands not aligned with sustainability (e.g. marketing standards, price).
- Unfair competition in transport (e.g. shipping prices impacted by cheap flag countries with low standards, taxation of ships).
- Lack of international sustainability standards and belief that it is difficult and/or costly for the EU to impose standards; lack of partnership agreements with countries of origin; lack of information on sustainability standards for producers in non-EU countries; lack of information on risks of non-compliance with sustainability standards when products reach the EU.
- Consolidation in trade sector (limited number of players from local to transnational level).
- Exports from other continents not respecting, or ignoring EU food/marketing standards, leading to the rejection and loss of sub-standard production when controlled upon delivery; insufficient EU support of respective capability development to meet standards.
- Prevalence of low consumer food prices (also due to preference by consumers).
- Foreign farmers not owning their land or other means of production (e.g. animals owned by a European owner, seeds controlled by a company) limit possibilities for oversight and control for sustainability – this does not only concern European owners, but also investors from other parts of the world with less oversight.





4. Building blocks

Based on the exploration of drivers for sustainability-related behaviour of food system actors, possible building blocks for a legislative framework for sustainable food systems were identified. There are five building blocks, ranging from sustainability assessment as the foundation for a legislative framework, to transparency, dealing with the consequences of the transition, policy coherence and multi-level governance, and international trade. The building blocks are described in more detail below.

4.1 First considerations for a sustainability assessment framework

Providing a practical framework to assess the sustainability of the EU food system is essential for any policy intending to achieve that ambitious and complex goal. Developing such a framework requires (i) to identify the various sustainability dimensions deemed essential, (ii) to develop a clear understanding of what falls under these dimensions and to identify the corresponding criteria to select the information that is relevant to the purpose of assessing sustainability, and (iii) to identify the specific required indicators and information sources in order to be able to assess.

Such an assessment framework then requires the development of a method to analyse and make sense of this information to serve the goals of the policy (e.g. link parameters to actors, attribute shares of objectives, determine how to aggregate results, etc.) and to determine a set of targets that define what needs to be achieved to consider that the policy has been a success. This is beyond the scope of this project.

The work presented here is a preliminary consideration on a way towards developing an evidence-based framework to assess the sustainability of the EU food system (and

possibly of any food system), especially in view of the many remaining gaps in the evidence that would be needed to cover all the criteria and indicators proposed here²⁹. It proposes a long list of criteria and indicators collected in a series of collective brainstorming sessions involving the participants in this project. While the work was structured around five separate dimensions of sustainability to facilitate the reflection (derived from the work of SAPEA³⁰: Food security, safety & nutrition; environment; resilience; economic viability; and fairness inclusiveness and ethics), it became quickly clear that many of the criteria and indicators that were identified were relevant for more than one dimension (e.g. the fair distribution of added value along the food chain has an economic dimension but also falls under the dimension ‘fair, inclusive and ethical’). These overlaps and interlinkages confirmed and reinforced the systemic nature of the exercise.

This reflection was carried out with an integrated perspective at the scale of the overall EU food system. It looked at all actors and all sub-sectors covered in the broad scope of this project, while it considered all the dimensions of sustainability. The discussions made clear that achieving sustainability requires the simultaneous achievement of specific targets across all dimensions through the collective action of all actors. The discussions also stressed the importance of assessing environmental impacts considering a life cycle perspective.

Further discussions have shown that significantly more work would be needed to translate this into a practical tool and assessment system for EU, national or local level, or at the scale of categories of actors or even at the level of individual actors, capturing different levels of granularity and different food sub-systems. What is presented here is the aggregated picture at the level of

²⁹ OECD 2021 Overcoming evidence gaps on food systems, <https://doi.org/10.1787/44ba7574-en>

³⁰ SAPEA, Science Advice for Policy by European Academies. (2020). A sustainable food system for the European Union. Berlin: SAPEA. <https://doi.org/10.26356/sustainablefood>, p. 68

the whole EU food system generated collectively through the project.

Focusing policy action on the sustainability of the EU food system as a whole, requires dealing with a higher level of complexity compared to existing and well-developed (if partial) efforts, such as those at product/organisation level (such as the Product Environment Footprint³¹ or the Organisation Environmental Footprint³²). At EU and Member State level exercises such as the Consumption footprint³³, have a specific focus on the environmental footprint of the food system³⁴. In particular, these Life Cycle Assessment (LCA)-based methods only deal with certain aspects of the environmental dimension of the sustainability assessment framework. But efforts must be made to ensure as much complementarity and reuse of data as possible. A number of indicator frameworks have already been developed by a range of international organisations (e.g. United Nations Millennium Development Goals and Sustainable Development Goals, Eurostat agri-environmental indicators, European Environment Agency indicators, OECD agri-environmental indicators, FAO indicators of sustainable development). Several research projects have also developed other sets of indicators for the environmental dimension of sustainability (e.g. AE Footprint³⁵, FLINT (for the *farm accountancy data network* FADN)³⁶). Thanks to the participation of a wide range of participants who were familiar with the Farm to Fork Strategy and the Common Agricultural Policy, this exercise benefited from the knowledge of indicators already existing in these frameworks.

In view of the very long list of criteria identified, i.e. the elements defining the five sustainability

dimensions considered in this project, it became clear that their number was too high to be applied in a practical way and that not all were equally important in the current EU context. A collective prioritisation exercise³⁷ allowed to focus the reflection on what was deemed by the participants to be most relevant. This led to a shorter (but still long) list of about 45 criteria which bears witness to the inherent complexity of the food system (see Table 2). Further processing is needed to strengthen the coherence and comprehensiveness of the set. Also, while a majority of the criteria and indicators proposed here are already in use and could be considered as meaningful information sources, some lack such information sources and others are novel and would require the development of new monitoring systems, as noted in a recent OECD report²⁹.

Some indicators have been included to show the importance of the parameter to be considered for a meaningful assessment of sustainability, but they still lack technical specifications to make them truly operational (e.g. impact of fishing on critical marine habitats). Defining specifically the objectives that the indicators are expected to serve will be essential.

An effort has been made to avoid indicators measuring activities (e.g., “number of sustainability trainings provided to food actors”,

31 Zampori, L. and Pant, R., Suggestions for updating the Product Environmental Footprint (PEF) method, EUR 29682 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-00654-1, doi:10.2760/424613, JRC115959. https://eplca.jrc.ec.europa.eu/permalink/PEF_method.pdf

32 Pelletier N. et al (2012) Organisation Environmental Footprint (OEF) Guide https://ec.europa.eu/environment/eussd/pdf/footprint/OEF%20Guide_final_July%202012_clean%20version.pdf

33 <https://eplca.jrc.ec.europa.eu/sustainableConsumption.html>

34 <https://eplca.jrc.ec.europa.eu/FoodSystem.html>

35 FP6 project: The Agri-environmental Footprint, <https://cordis.europa.eu/project/id/6491/reporting>

36 FLINT (Farm Level Indicators for New Topics in policy evaluation) project, FP7, <https://www.flint-fp7.eu/>

37 Participants were asked to identify the 5 most significant criteria to assess sustainability within each of the 5 dimensions of sustainability defined previously.



which does not give any precise idea of the real effect that this has), and to focus on indicators of pressures, outcomes or impact.

The criteria and indicators presented in this reflection paper result from a brainstorming that was largely inspired by today's EU food system (see Table 2 for an overview of the criteria, and Annexes 2 and 3 for the complete set of criteria, indicators, and useful data sources). While most of the indicators that were identified are expected to remain important over the long-term, the project did not allow a systematic assessment to be performed yet.

Finally, design, conceptual work and further prioritisation would be still needed on how to present this list of criteria and indicators and how to turn them into an operational sustainability assessment dashboard (Reduced set? Composite indicators? Colour coding? Etc.).

An agreed operational sustainability assessment framework would be a powerful tool if it became available to monitor progress. This could open the possibility to have periodic monitoring reports (e.g. akin to the German 'Agrarbericht'³⁸) as well as a reference for benchmarking the practices of all actors in the food system. This could also be a powerful tool for transparency and consumer information. A number of systems already exist, or are proposed that cover part of these needs (e.g. Farm Sustainability Data Network³⁹, FNH-RI⁴⁰, etc.).

38 The German 'Agrarbericht' is a periodic publication of the German government that reports on the state of play and developments in agriculture and rural areas as well as in respective policies.

39 Conversion to a Farm Sustainability Data Network (FSDN), see https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12951-Conversion-to-a-Farm-Sustainability-Data-Network-FSDN-_en

40 Food, Nutrition and Health Research Infrastructure <https://fnhri.eu/>

Table 2: Criteria of the sustainability assessment framework categorised according to broad sustainability dimensions derived from the SAPEA working definition of a sustainable food system⁴¹

FOOD SECURITY, SAFETY & NUTRITION	
Provides and promotes safe, nutritious and healthy diets to all EU citizens, without compromising the availability of safe, nutritious and healthy food and diets for people living outside the EU	<ul style="list-style-type: none"> • Food security, and nutrition across the EU providing a healthy diet • Food security and nutrition outside the EU providing a healthy diet • Food safety/Foodborne disease burden • Antimicrobial resistance • Non-food borne infectious diseases • Relevant environmental impacts on health • Occupational health • Non-communicable diseases burden
ENVIRONMENT	
Low environmental impact, protects and restores the natural environment	<p>Environmental pressure</p> <ul style="list-style-type: none"> • Land use/land use footprints/total land used by EU food system/Soil degradation (erosion, depletion and contamination) • Seabed and marine ecosystems use footprints (e.g. fish stocks depletion) • Water use/ footprints (water use, management, allocation & access, depletion of aquifers, water stress) • Air, water and soils pollutions • Use and recycling of food & beverage packaging • Degree of deforestation and reforestation • Use of pesticides and other toxic substances • Fertiliser use and production • Reactive nitrogen emissions • GHG emissions (from energy, transport, land use, land use change, livestock, inputs, waste): carbon dioxide, methane, nitrogen oxides <p>Environmental impact</p> <ul style="list-style-type: none"> • Carbon stored in soils • Level of anti-microbial resistance • Contamination of fauna & flora • Land productivity • Impact on terrestrial and marine biodiversity & ecosystem services
RESILIENCE	
Robust, adaptable & transformable food system	<p>Capacity to adapt</p> <ul style="list-style-type: none"> • Resilient governance • Diversification of farming systems • Logistics resilience <p>Robustness</p> <ul style="list-style-type: none"> • Diversification in agriculture, aquaculture, fisheries and food processing • Diversity of the genetic pool of food plants, livestock and species in aquaculture farms • Territorial diversity (territorial approach to food security and nutrition, short vs long chains)

⁴¹ SAPEA, Science Advice for Policy by European Academies. (2020). A sustainable food system for the European Union. Berlin: SAPEA. <https://doi.org/10.26356/sustainablefood>, p. 68

ECONOMIC VIABILITY	
Economically viable food system	<ul style="list-style-type: none"> • Economic viability of businesses respecting sustainability criteria • Access to capital, to best/advanced technology, land and vessels • Affordability of a healthy diet (quality & quantity of food)/addressing food poverty/right to quality food • Fair distribution of added value along the food value chain • Market share of sustainable diets/true cost
FAIR, INCLUSIVE & ETHICAL	
A fair, ethical, socially acceptable and inclusive food system	<p>Fair employment conditions across the food system</p> <ul style="list-style-type: none"> • Living wages • Stability of employment • Just, safe and decent working conditions (including child labour, forced labour, schooling, health care, access to trade union, gender accessibility/equality) <p>Fair business environment</p> <ul style="list-style-type: none"> • Autonomy of actors/degree of dependency • Access to knowledge for all food supply chain actors <p>Consumer empowerment</p> <ul style="list-style-type: none"> • Food environments for healthy diets from a sustainable food system (including digital environment, marketing practices, choice diversity, choice environment and access/availability) • Knowledge and education about food, diets and the food system, traditional diets <ul style="list-style-type: none"> • Animal welfare
CROSSCUTTING	
	<p>Capacity to innovate</p> <ul style="list-style-type: none"> • Investment in R&D related to food systems (private and public) • International competitiveness of EU food system R&D <ul style="list-style-type: none"> • Policy coherence • Policy coherence for development and international trade (imports & exports with positive impact and that do not harm local food systems); Impacts on local food systems • Quality of governance (various dimensions) • Transparency and accountability across the food chain

4.2 Transparency in the food system

Transparency rapidly emerged from the discussions with the participants as being a strong element to promote sustainability. Transparency is a necessary property of the food system to enable accountability and responsibility. It should facilitate data and information exchange on sustainability criteria between relevant actors, i.e. between businesses, consumers and public authorities. Transparency builds on the sustainability assessment framework elements as proposed in Section 4.1. An advanced and robust infrastructure would be required to collect, process and make available the relevant data and information to and from each food

system actor. Innovation in digital technologies has the potential to facilitate the implementation of such a system.

The objectives of ensuring transparency across the food system are to:

- Enable informed choices and optimal operation by all actors in the food system. The flow of relevant information between businesses needs to be improved to inform their transactions. This includes relevant information on labels and certifications regarding their scope and assessment

processes (in particular for aggregated labels, which might be needed to inform especially consumers). More clarity should enable a comparison and benchmarking of labels, operators and value chains, and increase the credibility of labels and certification schemes. Furthermore, more information about the origin of products and their ingredients is deemed important (in addition to other sustainability criteria), to facilitate comparative assessment of different choices for public procurement.⁴²

- Build trust within the food system and contribute to a level playing field by reducing the current information asymmetry (some actors, e.g. retailers, have access to a lot more information than others).
- Support sustainability in the EU and beyond by making it possible to assess and monitor progress towards sustainability, facilitating a systemic understanding and ensuring a level playing field regarding sustainability.
- Support the implementation of accountability and responsibility, such as
 - Improve corporate governance, e.g. according to United Nations Guiding Principles on due diligence⁴³ including environmental aspects.
 - Oblige all actors, including farmers and fishers above a certain annual turnover threshold, to be audited and certified by third parties on their environmental, social and governance (ESG) performance; and to provide a digital dashboard.
 - Oblige food processors to report downstream on ESG data (taken from the digital dashboard of primary producers).
 - Oblige all actors, including primary producers, above a certain annual

turnover threshold to publish their ESG performance (similar to current obligations for larger companies).

- Solve the issue of (too) many sustainability indicators and schemes by classifying primary producers and other actors into red, orange, light green and dark green according to one public certification process of reference. Companies could still be free to add private labels.
- Oblige retailers to provide consumers with third party certified and verifiable information on sustainability and nutritional qualities of products.

The following elements were deemed important to achieve an effective transparency system.

First of all, the provision of relevant sustainability data and information should be made mandatory, obliging all relevant actors in the food system to generate the necessary data and feed it into a transparency system. This includes data relevant for sustainability assessment (from the sustainability assessment framework) and information relevant in B2B relations, relevant for public authorities, and relevant for an informed food choice by consumers. The possible burden resulting from this effort for smaller enterprises needs to be considered, with e.g. a slower phasing-in of reporting obligations, a staggered increase of reporting obligations according to e.g. turnover, and targeted support measures. Support for SMEs to digitise paperwork (invoices, etc.) and reduce administrative burden could help. Exemptions should only be granted based on low risk, not on size of operator.

Data quality will be of utmost importance in terms of:

- Accuracy and verifiability;
- Reliability and compatibility (harmonisation of

⁴² Some rules are already in place: EU Regulation 1169/2011 on food information to consumers lays down general rules on origin indication, there are sector-specific rules, as well as additional rules at national level. Furthermore, the Farm to Fork Strategy includes an action on mandatory origin indication for certain products.

⁴³ See United Nations Guiding Principles on Business and Human Rights (UNGP) <https://www.ohchr.org/EN/Issues/Business/Pages/CorporateHRDueDiligence.aspx>

definitions, terminology, methods, metadata);

- Timeliness of data availability.

The participants identified current data gaps, in particular regarding the ‘middle part’ of the food chain, i.e. manufacturers and retail (including data that might be available, but is kept confidential). In addition, for several important sustainability criteria, data (e.g. for the social dimension of sustainability, on true cost of food), or methods (e.g. for assessing the impact of EU policy on global food security or working conditions), are missing. Data and information should also reflect the needs and reality of the different levels of governance, from local system level to EU food system level.

Clear rules for access to data will also be essential, adapted to the respective needs of the different food system actors. A major issue of concern relates to the confidentiality of strategic business data and information (supply chain data). Traceability requirements according to the General Food Law⁴⁴ might need to be reconsidered from a broader sustainability and due diligence perspective. Specific and limited confidentiality agreements might be needed, but the legitimate interest of public authorities to ensure sustainability at system level must be recognised, as well as the needs of research (i.e. exceptions for research). In addition, the collection and use of consumer data for commercial purposes (personalised marketing) might be used to provide feedback to consumers regarding the sustainability of their choices.

Data and information need to be provided in a form and format that facilitate their use. This is of particular importance for consumers, but also e.g. for public procurement officers who

need to understand sustainability performances of alternative supply chains and production processes, to make informed decisions regarding tender requirements.

Currently, many (often national) certification schemes and labels are used to guide purchasing decisions. However, the large number and diversity of schemes and labels (some very targeted, some difficult to evaluate) render their use rather difficult for procurement, as well as private consumers. The participants agreed that a transparent assessment and benchmarking system could be a first important step to rationalise the current landscape of labels and schemes (see for example benchmarking by Milieu Centraal, a Dutch environmental information and education foundation⁴⁵). EU-wide recognition of independent (quality) labels could also contribute to easing their use and to reducing the burden of certification for several similar labels (e.g. for farmers) and in this way would improve the functioning of the Single Market. These schemes could be used to increase sustainability ambition over time and the potential for integration and complementation of the existing schemes and labels could be looked at.

The development of EU schemes and labels (following for example the model of the current organic label⁴⁶) could be another option, providing harmonised minimum standards for sustainability to be adhered to. This would also open the possibility of introducing fewer, but more aggregated label(s)/sustainability scores to facilitate consumer information. Further action is being considered at sectoral level, for example in fisheries (see the action on the revision of EU marketing standards under the Farm to Fork Strategy). The advantages of more complete and

44 Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, OJ L 31, 1.2.2002, p. 1

45 <https://keurmerkenwijzer.nl/wat-zijn-topkeurmerken/> (in Dutch); Milieu Centraal (2021) Certification label guide fact sheet

46 See also COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONSON AN ACTION PLAN FOR THE DEVELOPMENT OF ORGANIC PRODUCTION COM(2021) 141 final/2

specific information (accessible through labels and other means) needs to be balanced against those of a simpler, aggregated but less detailed label. Digital applications could allow a multi-layered and/or thematic information provision for consumers who would like to have information on specific aspects. Another aspect of labelling refers to the use of static or dynamic information, the latter providing the possibility to show the progress of producers towards sustainability.

These considerations point to practical steps that could be considered to build more transparency into the operation of the EU food system. For a start, it should be possible to identify what data are already available and where (with which actors). For example, retailers already collect information from their providers, there is market data generated and owned by private companies, data from specific public support schemes (e.g. integrated production scheme in southern Spain⁴⁷), etc. These data could be shared under certain conditions.

It would also be useful to develop a process to reduce the current large number of labels and come up with a set of meaningful and comprehensive sustainability labels and certification schemes. For labels targeting consumers, it is important to be able to assess their effectiveness in terms of impact on the market and on consumer choice (i.e. consumer attention to, understanding and use of the labels). This could be accompanied by the development of a mechanism for collecting data in line with the FAIR principles⁴⁸. This could go together with the establishment of a data management infrastructure (e.g. interoperable centralised or connected data banks), automatic data collection and transmission where possible, exploration of the use of blockchain or similar

(less energy intensive) approaches, building on existing infrastructure (e.g. traceability system, other initiatives⁴⁹).

Harmonisation would also go a long way. Developing common approaches and methodologies and/or enabling compatibility, (e.g. compatible software tools) for harmonised Life Cycle Assessment approaches, environmental footprint assessments, etc. would enable comparisons between production processes and products.

Efforts could be kept to a minimum by identifying possibilities for combining existing data sources intelligently (resulting in additional information) and to making the most out of what is already available (see e.g. study on extended financial accounting in agriculture or the FP7 FLINT project⁵⁰), also with a view to reducing additional burdens, in particular for SMEs.

Considering alternative approaches to certification schemes at the local/regional scale, such as participatory guarantee schemes, would also contribute to building trust in the system, as well as the creation of a new regulating entity to harmonize certification schemes.

4.3 Dealing with the consequences of the transition

The long-term positive consequences of a sustainable food system were clear for all participants. Also, that the transition to a sustainable food system will require deep changes in many policy fields and at several policy levels is clear. Synergies between different sustainability dimensions should be sought for and used to increase positive impacts. They are often possible (e.g. positive environmental and health effects of the reduction

47 Junta de Andalucía, Integrated production (in Spanish) <https://www.juntadeandalucia.es/organismos/agriculturaganaderiapescaydesarrollosostenible/areas/industrias-agroalimentarias/produccion/paginas/produccion-integrada-ia.html>

48 the FAIR principles for data: Findability, Accessibility, Interoperability, and Reusability; Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. 2016 The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* 3, 160018. <https://doi.org/10.1038/sdata.2016.18>

49 For example GS1 <https://www.gs1.org/>, AgGateway <https://www.aggateway.org/Home.asp>

50 Regionalwert AG, Germany <https://www.regionalwert-ag.de/wp-content/uploads/2020/11/Calculate-it-right-oct20.pdf>; and the results of the FP7 FLINT project on a data infrastructure for farm-level sustainability indicators: <https://edepot.wur.nl/414173>

in intensive red meat production and red meat consumption). However, in some cases, simultaneous requirements can be in conflict (e.g. reducing food packaging to reduce the corresponding waste could end up increasing food waste as food is less protected). In any case, similar to the current situation where there are actors who benefit more and actors who suffer more, there will be negative consequences of the transition process on specific actors or practices, at least in the short-term, that will need to be fairly managed. This is not only relevant in terms of ensuring the necessary societal support for the transition, and minimising barriers. Possible consequences of transition measures need to be assessed in advance in order to avoid situations in which gains in one sustainability dimension, result in unreasonable losses for another. Measures can be put in place to counter these effects. Inevitably, tensions will emerge, for example linked to:

- Rising consumer food prices in the short term due to increasing production costs (e.g. sustainable primary production, investment in technologies, infrastructure and logistical or organizational systems, sustainable packaging, labour costs). In the longer term, research and development and new technologies, new production practices as well as changing economies of scale might contribute to reducing these increased food prices. Currently, many societal costs (e.g. environmental damage, health costs, social impacts) not reflected in today's food prices nevertheless affect society, often the very people living in food poverty.
- Market re-organisation to balance local/EU needs for sustainable food and food operations, diversity and resilience with competition and dependency on global markets for food security (tension between efficiency and resilience).
- Obsolete business models, leading to jobs and/or income loss, at least in the short-term. New business models will call for new skills that might not be readily available at first. As these impacts will be local, possible

tensions between EU/national/regional/local perspectives might emerge.

A successful transition requires a process to accompany the changes and manage the tensions likely to emerge. One option could be to establish an inclusive process to increase transparency, alleviate concerns and find solutions. The participants in the project identified the key elements for such a process, presented below. Another idea that was briefly mentioned, but not further explored referred to the establishment of a dedicated clearinghouse to deal with the diverse tensions resulting from the transition.

WHO?

- The process should be hosted (but not run) by the EU.
- As a collective process, it should be co-owned by the participants.
- The process should include all relevant stakeholders of the food system, also those often not involved (e.g. traders, youth, health sector, energy providers, waste management operators).

WHERE?

- Multi-level process – EU, Member States, regional and local - to capture diversity, support cultural identity and ensure the optimum articulation between the various governance levels to make sure that sustainability works 'on-the-ground'.
- Within companies and across sectors, e.g. employees discuss sustainability commitments.

WHEN?

- The process should start as soon as possible to be able to involve all relevant stakeholders from the start and operate proactively.
- It is an iterative, long-term process.
- Need for certainty for the private sector and for long-term investments to be considered.

HOW?

- Strong bottom-up component to credibly engage all stakeholders, generate trust and gain access to ‘on-the-ground’ evidence.
- Guiding principles need to be set centrally, generate a common sense of purpose but preserve the flexibility of local action.
- New spaces for interaction and experimentation, e.g. living labs.
- Supported by sound and comprehensive scientific inputs.

Such a process would benefit from more and better tools and techniques to make it possible to capture the collective intelligence generated. Policymakers might benefit from training in systems approaches and participatory processes to facilitate active engagement of all relevant stakeholders and optimum uptake of the insights generated. The process could feed into an annual ‘*sustainable food system report*’ by presenting activities, developments and progress, thus contributing to transparency in order to direct action.

4.4 Policy coherence & multi-level governance

The purpose of a sustainable EU food system is to provide long-term food security in a broad sense⁵¹ to all people living in the EU without compromising food security and the respective food systems for people living outside the EU. The provision of food security is crucial to ensure the long-term existence of the European population. This project has clearly confirmed that the food system sits at the core of life in the EU and has shown that many policies have a direct influence on its ability to fulfil its role.

It is clear that the EU has a major role to play in developing policy for a sustainable EU food system, and the Treaty on the Functioning of the European Union gives the EU significant policymaking competences in this domain. In addition, as the overarching goal of EU policy is to achieve sustainability over the long-term, the EU already has a broad framework in place to create policy coherence for sustainability. In particular, the European Commission is already using the UN Sustainable Development Goals (SDGs) as a compass for policy development, with e.g. SDG 2 already dedicated to ending hunger and all forms of malnutrition by 2030. Many other SDGs have a direct link to the food system⁵².

The case of affordability of a healthy diet from a sustainable food system was explored as an example in terms of policies involved (see Figure 4), and this exercise shows the broad range of the very diverse policies that affect it. For example, environmental policies can affect the cost of food production and/or the livelihoods of farmers and fishers; education (and education policies) strongly influence people’s attitude and ability to access healthy diets and to make them affordable; social policies affect labour and living conditions across the food system, as well as the ability of households with low socio-economic status to afford a healthy diet from a sustainable food system, etc. However, none of these policies have the provision of healthy diets or a sustainable food system as their main objective and there is a high risk that actions to serve the diverse objectives of these other policies do not align to facilitate the provision of healthy diets from a sustainable food system.

Furthermore, as no single policy will be effective enough to ensure the intended outcomes, a comprehensive and coherent approach

51 Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. (1996 World Food Summit); a broader understanding of food security including agency and sustainability has been put forward by e.g. HLPE (2020), Food security and nutrition: building a global narrative towards 2030. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. <https://www.fao.org/3/ca9731en/ca9731en.pdf>

52 More information on the links between EU policies (incl. Farm to Fork Strategy) and SDGs and SDG interlinkages can be found on KnowSDGs (Knowledge base for the Sustainable Development Goals) Platform, which provides tools and organises knowledge on policies, indicators, methods and data to support the evidence-based implementation of the SDGs: <https://knowsdgs.jrc.ec.europa.eu>

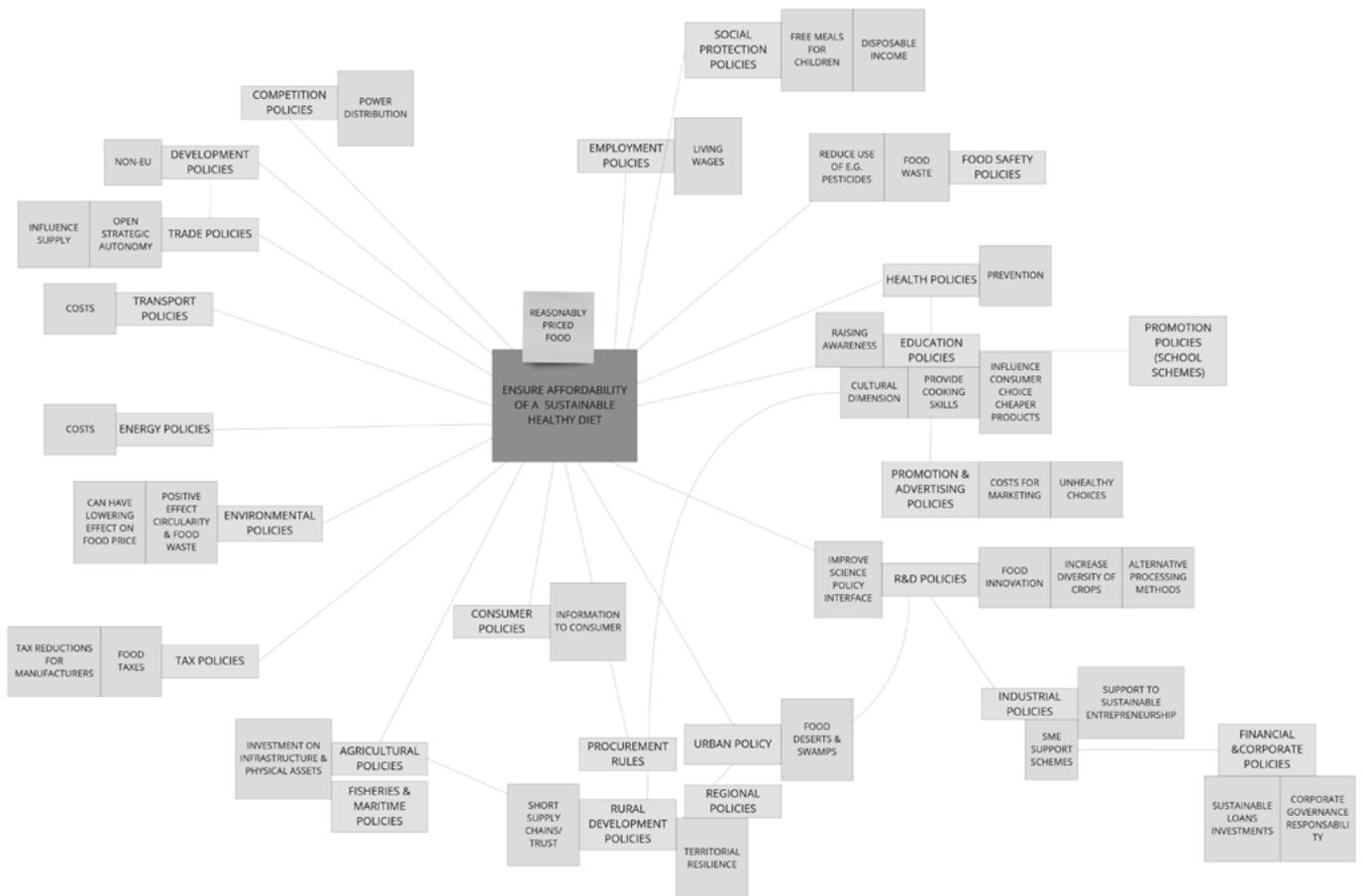
integrating actions from diverse policy areas is needed. The resulting challenge is how best to create this coherence across many policy fields for the sustainability of the food system.

A systemic understanding and approach

The policy approach needed to achieve a sustainable EU food system needs to be built on an integrated food system-approach and cannot be a product-based approach. As witnessed by the draft sustainability assessment framework presented in Section 4.1, the concept of

sustainability of the food system (and in general) is complex, multidimensional and difficult to define. It is also undoubtedly a dynamic concept that will evolve over the coming years. While this might be perceived as a problem, it is also an opportunity because it provides scope for flexibility of implementation and adaptation to local and sectoral conditions.

Figure 4: Policies involved in the affordability of a healthy diet from a sustainable food system (the image shows the outcome of a group brainstorming session)



The discussions in this project have also shown that driving change in the food system requires simultaneous and coordinated policy action across the system to address problematic behaviour and interactions between actors. For example, to shift towards more plant-based diets, not only does production need to make sure that the relevant foods are available and appealing, but the consumers also have to be willing, able and knowledgeable about how to prepare attractive meals with these foods, in a way which is compatible with the necessary cultural and social parameters corresponding to their circumstances. Efforts to increase the adherence to national dietary guidelines and to make these guidelines compatible with diverse cultural groups might be useful in this respect. Work also needs to be done to understand what sequencing of actions would have the best result. In particular, feeding children a diet using more plant-based, seasonal products can have lasting effects on eating habits. Of course, in view of all this, coordinated investments are required throughout the system at all relevant levels (e.g. regional, local) to ensure that the corresponding food safety infrastructures (e.g. cold chain) are in place.

Furthermore, the barriers to change need to be identified (e.g. legal requirements, technical standards, cultural circumstances, harmful subsidies, slow introduction of technologies). Experimentation is required to find what alternative approach(es) could still deliver what is needed in terms of food safety and nutrition while improving sustainability. Research is also needed on more holistic technical solutions, such as for example new breeding techniques combined with new agricultural practices, or risk/benefit assessment adapted to the diversity of food environments.

A pragmatic compass for policy coherence

From the many discussions among the participants, a strong majority view emerged that we are now

in an emergency situation due to, among others, a fast-changing climate and biodiversity loss as well as an obesity pandemic. As a result, and in view of the time likely to be needed to implement the deep changes required to respond to this situation, the dominant opinion was that there is no time to waste for starting to take actions in favour of sustainability. However, the level of complexity of the food system and the multi-dimensional nature of sustainability require a practical way to prioritise actions. A few essential principles emerged from the discussions that can help develop a pragmatic framework to build policy coherence:

1. Take a long-term perspective looking at all dimensions of sustainability.
2. Better align priorities and subsidies for primary production according to dietary guidelines for healthy diets from a sustainable food system– send the right economic signals (and accordingly for non-food primary production).
3. Use food and nutrition security needs (in a broad sense) as a key criterion when deciding on possible land/maritime domain or land use changes.
4. Protect and restore biodiversity and ecosystems and respect the planetary boundaries.
5. Ensure transparency and the best possible access to evidence across all relevant policies.
6. Strengthen the science-policy interface and use the scientific evidence.
7. Do not use low consumer food prices as a social policy instrument.
8. Strengthen the connection between all governance levels (local, national and EU) .
9. Rebalance the power distribution across the food system (e.g. strengthen primary producers, address retailer buying power).
10. Engage meaningfully with all relevant stakeholders.

A policy approach coordinated across many policy domains is necessary to lead to the required

system-level change. In that sense, calls emerge for the development of a food system policy at EU level, possibly with the publication of a yearly EU food system report.

A coherent multi-level governance for the EU food system

The complexity and diversity of the food system requires a robust collective understanding of this system to be developed and maintained. This is essential if one is to be able to engage the EU food system successfully on a path towards sustainability. This will not only have to rely on a robust sustainability monitoring and assessment framework, but also to involve the multitude of actors and stakeholders of the system at all levels in a coherent way. The need for coordination of action also calls for the establishment of structures for constructive exchange at EU and national level connecting with the regional level, complementing the necessary policy coherence with essential multi-level governance.

The robust governance required for this endeavour will require both a set of strong principles and a clear organisation. This needs strong policy action. The key principles that emerged from the discussions throughout this project are:

- Transparency, developed specifically in Section 4.2 of this report as a key driver of sustainability;
- Inclusiveness, in view of the multiplicity and diversity of actors involved in the food system, but also of the range of people and actors affected by the food system. The need to include citizens came back repeatedly;
- Collective intelligence, to develop the level of understanding required to come to grips with the complexity and diversity of the food system;
- Autonomy at the relevant level (i.e. subsidiarity), to ensure that the various actors are empowered

to promote and build sustainability within their own field of operation;

- Evidence-based approach, in line with the Better Regulation approach applied for EU policy development⁵³, to make sure that any development takes reality into account;
- Values-based approach, aligned with human rights and the values defended by the EU Treaties;
- Focus on people, as ultimately the purpose of the EU food system is to provide long-term food security to all people living in the EU, including future generations.

In order to put these principles into practice, the work must be organised through bodies and forums spanning the breadth and depth of the Union. The diversity of stakeholders, including citizens (as they are those that the EU food system is there to serve), should be reflected in the different forums and platforms that will be needed to steer the course towards sustainability (see also Section 4.3).

Importantly, the governance system will have to have a strong vertical coordination to connect the top-down, EU level policy objectives with the bottom-up information and knowledge essential for setting realistic goals and ensuring good implementation. When taking policy action to achieve the sustainability of the EU food system, it is necessary to understand the likely impact of these actions on all the dimensions of the system, taking into account its multiple realities across the EU. This requires the capacity to access local knowledge, to be inclusive and to have governance structures that can connect all relevant levels of action. This is likely to work best if strong co-design processes and collective ownership of a food strategy and its delivery are put in place. Indeed, creating a high level of buy-in from the outset will be crucial, especially to avoid some of the current tensions re climate policy/energy poverty

⁵³ Communication from the Commission to the European Parliament, the Council, the European and Social Committee and the Committee of the Regions (2021) Better Regulation: Joining forces to make better laws https://ec.europa.eu/info/sites/default/files/better_regulation_joining_forces_to_make_better_laws_en_0.pdf

for example. This will require institutional innovation.

At the local level, the participants have identified a number of initiatives (e.g. participatory budgeting or planning) and structures that have proven to be useful for a successful governance in various places: Local Action Groups, citizen councils, food policy councils (e.g. as in Bordeaux, France; Ghent, Belgium), local NGOs, living labs, cooperatives and local or regional public services. Good examples from Milan⁵⁴ were cited, but they are few, and successful models and best practices still need to be shared more widely.

At the national level, a few relevant structures were named, such as national ministries, national citizen councils and NGOs. Some national comprehensive food strategies are being developed: e.g. the Netherlands, France and Denmark have taken preliminary steps, and there are potentially interesting initiatives also outside of the EU (e.g. England recently published a food strategy⁵⁵).

At EU level, the discussions throughout the project have identified the inclusive leadership role of the European Commission as crucial. In the case of the EU food system, this leadership should be systemic, with the following characteristics:

- Inclusive, mobilising, and systems aware;
- Focused on change driven from both inside and outside the current food system;
- Understanding the underlying processes and dynamics of the EU food system;
- Focused on a demand (i.e. sustainability) having greater legitimacy than existing power structures;

- Involving futures work/visioning, design and co-creation approaches;
- Seeking to grow the seeds of the new system within the existing system;
- Developing a complexity and multi-perspective overlay, including a critical challenge to the current values in the system.

Importantly, this leadership must make space for a diversity of perspectives on what is the EU food system and be flexible to avoid falling into the trap of seeing the system as static and developing mechanistic interventions that take a single EU-level perspective⁵⁶. This makes it crucial to engage in inclusive foresight and co-creation approaches that allow the development of interventions that take strategic perspectives from different vantage points and consider relevant interactions between diverse policy levels and domains⁵⁷.

Specific considerations and ideas

A few specific ideas were proposed to help strengthen the current governance structure and best serve the transition towards sustainability. One is to create an “EU Sustainable Food Systems Platform” as soon as possible. It would have a system-wide remit aimed at facilitating exchanges between Member States, regional authorities and other key actors in the food system about how to implement and support the achievement of the Farm to Fork Strategy objectives during the preparation of a forthcoming framework legislation already. This platform, connecting private initiatives, know-how and resources with public policy goals, can partly build on the experiences of e.g. the

54 Milan food policy & Milan Urban Food Policy Pact <https://www.milanurbanfoodpolicypact.org/>

55 The Netherlands: Netherlands Scientific Council for Government Policy 2016 Towards a food policy <https://english.wrr.nl/publications/reports/2016/12/13/towards-a-food-policy> ; France: National Program on Food and Nutrition (PNAN) <https://agriculture.gouv.fr/pnan-le-programme-national-de-l'alimentation-et-de-la-nutrition> ; Denmark: Food-based dietary guidelines 2021, <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/Denmark/en>; England: National Food Strategy 2021, <https://www.nationalfoodstrategy.org>

56 Benjamin Taylor (2021) Six ways to see systems leadership, <https://i2insights.org/2021/06/22/systems-leadership>

57 See for example Bontoux & Bengtsson (2016) Using Scenarios to Assess Policy Mixes for Resource Efficiency and Eco-Innovation in Different Fiscal Policy Frameworks, <https://doi.org/10.3390/su8040309>

EU Platform on Food Loss and Waste⁵⁸ or the EU urban agenda partnerships⁵⁹ and can be inspired by the Governance of the UN Committee on World Food Security (CFS)⁶⁰. Application and selection of participants would need to be transparent.

In view of the centrality of the need to monitor and evaluate the sustainability of the food system, many voices called for the attribution of this task to a specific independent body. Ideas that were floated included giving an additional mandate on sustainability to the European Food Safety Authority EFSA, tasking the JRC with coordinating and integrating work performed by various bodies on the various dimensions of sustainability, involving statistics offices, etc. Linked to this question is the need for monitoring and reporting at all levels, a vast task covered in this report under the sustainability assessment framework and under the need for transparency. This also raises the point of the importance of digital technologies.

Another concrete suggestion regarding a forthcoming framework legislation was to require Member States to develop comprehensive national strategic plans for sustainable food systems. This would require inclusive multi-level co-creation processes going beyond the traditional sectors and silos and managed by independent parties⁶¹. These strategic plans would need to be accompanied by implementation plans and aligned with other national plans, such as the climate plans, energy plans and upcoming recovery plans.

4.5 International trade for sustainable food systems

The EU is one of the main importers and exporters of food and feed globally and strives to maintain

global markets open. This close integration with the global food system is reflected in the EU's ambition to support the '*global transition to sustainable agri-food systems*', clearly spelled out in the Farm to Fork Strategy. Apart from ensuring food security in the long term, contributing to the protection of global public goods (e.g. rainforests) and addressing the negative social and environmental effects of EU food consumption outside the EU, taking such a global outlook is also necessary to understand the role of EU food system actors. In particular, the study participants insisted that importing food products from third countries should not give rise to unfair competition. Increasingly strict EU sustainability standards, if not also applied to imported goods, would risk undermining EU production, rendering it less competitive and potentially resulting in less sustainable production and related negative impacts elsewhere. This does not mean that products or production processes from third countries are by default less sustainable than those in the EU, but the situation needs to be assessed to ensure the establishment of a level playing field and a virtuous dynamic.

Sustainability standards – a key element for sustainable international trade

The participants agreed, that by default, products imported into the EU should adhere to the same sustainability standards or at least to standards recognised as equivalent to those applied to EU products. They considered this necessary to avoid weakening sustainable production in the EU through the import of cheaper products from elsewhere resulting from unsustainable practices (level playing field) and to stimulate sustainable production (in all its diversity) in countries exporting to the EU.

58 https://ec.europa.eu/food/food/food-waste/eu-actions-against-food-waste/eu-platform-food-losses-and-food-waste_en

59 https://ec.europa.eu/regional_policy/en/policy/themes/urban-development/agenda/

60 UN Committee on World Food Security CFS, <https://www.fao.org/cfs/en>

61 Inspiration can be drawn from the recent English National Food Strategy process <https://www.nationalfoodstrategy.org/>.

An obvious starting point for the development of sustainability standards valid for international trade is the sustainability assessment framework to be developed for the EU. Those standards would primarily be production (including processing) standards, providing indications on which social and environmental performance levels are acceptable and unacceptable in food production (as e.g. for organic farming, farm animal welfare). Standards on the characteristics of products, e.g. for food safety aspects of imported food (a key requirement in any case) and nutritional quality, can be controlled by analysing samples. However, this approach would not be able to capture many of the relevant sustainability criteria, such as how much greenhouse gases were emitted to produce the product, whether child labour was involved, or many other parameters of sustainability. Broader certification schemes applying to whole supply chains are necessary. For issues regarding climate change, the Carbon Border Adjustment Mechanism⁶² can be helpful.

A prioritisation of sustainability criteria might be needed to ensure that the most important aspects are covered and to facilitate a timely application. In particular, for sustainability criteria which are difficult to quantify (e.g. about working conditions), a consensus at international level might be more difficult to achieve. Furthermore, not all sustainability criteria and targets can be applied across the board (e.g. water footprint – not all regions face water scarcity). Those criteria that have a more universal application need to be identified. Aspects such as transportation and related environmental impacts would need to be considered in the overall sustainability score. For the identification of ‘trade-sensitive’ environmental standards, Baldock (2020) proposes environmental significance, level of

constraint for food production and impact on average production costs as selection criteria⁶³.

Possible implications of EU sustainability standards for producers and consumers in third countries (i.e. outside the EU) need to be considered. Producers from third countries might need support and time to adapt in order to be able to produce according to the agreed EU standards (or equivalent). Capacity building, e.g. via the European Development Fund, the Development Cooperation Instrument and UN Agencies could help, in line with development policies. Furthermore, there is a risk that third countries faced with higher EU standards could turn to other trading partners with lower standards instead, if EU market conditions are not attractive enough. This could rather inhibit a global improvement of sustainability and needs to be avoided, e.g. through targeted capacity building for producers in third countries. In some cases, imposing such sustainability standards might also negatively affect the capacity of the EU to source specific commodities. Capacity building could also imply moving export-oriented, high environmental impact EU production of food – such as certain types of meat production – to the non-EU countries of feed production or consumption. However, production shifts towards less efficient and environmental- or climate-smart areas raise issues about leakage (e.g. of greenhouse gases). Policy coherence is an essential requirement also in the context of international trade and sustainable food systems.

The following elements were discussed by the participants for advancing on trade and sustainable food systems:

The World Trade Organisation (WTO) is an important actor for international trade, but, while giving some recognition to the growing

62 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS' Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality

63 Baldock (2020) Environmental standards for UK agriculture in a new trade policy framework. Institute for European Environmental Policy. <https://ieep.eu/publications/environmental-standards-for-uk-agriculture-in-a-new-trade-policy-framework>

importance of sustainability, its primary mission focuses on the facilitation of trade⁶⁴. Also, because it is based on consensus, any reform of the mandate of the WTO will most probably take a long time. Therefore, while activities pushing for WTO reform/renewal are important and need to be pursued, they should be complemented by other, differentiated, but coherent actions. In this context, the following possibilities for a multi-pronged approach have been put forward:

(Green) Alliances and trade agreements – The EU could foster alliances with like-minded countries to move forward on sustainability goals, as already indicated in the Farm to Fork Strategy. A sustainability chapter could be included in all bilateral trade agreements that are currently being negotiated or planned for the future by the EU, allowing for enforcement of sustainability standards⁶⁵. However, updating existing trade agreements might be rather difficult.

Unilateral approaches – The EU could lead by example on sustainability, moving ahead with a stricter framework. If successful, it might help to convince other countries to follow. An example is the legislation on sustainable corporate governance, being prepared by the European Commission with a focus on social and human rights and environmental impacts along global supply chains of companies active in the EU⁶⁶. While there could be a first-mover advantage for EU producers/companies, competition issues might limit the effectiveness of this approach unless regulation controls/compensates the import of products not complying with EU sustainability standards.

Sectoral approaches – Another option might be to start with sectoral approaches, focusing on specific products or sectors, instead of trying to

enforce sustainability standards for everything at the same time. This could happen in parallel to the establishment of the legislative framework. Respective stakeholder involvement should go beyond the direct supply chain. To minimise the risk of falling back into ‘silo approaches’, an overall strategy and framework should be in place to frame the sectoral approaches. Examples that were mentioned during these discussions include cocoa and palm oil.

Align domestic demand – Due to the deep integration of the EU food system with international trade, EU domestic demand cannot be disconnected from trade policies and is a strong lever for change towards sustainable food systems. Product taxes can be an effective tool to guide consumption and are WTO compatible (but would not differentiate between different production methods, e.g. taxes would apply to all beef, regardless of how the cattle were reared). Information (e.g. labels), education and a favourable food environment need to be in place to enable healthy diets from a sustainable food system. In this context public procurement can play an essential role, first by implementing sustainability standards and secondly by sharing good practices, knowledge and experiences, thus increasing institutional capacity through international procurement networks.

What can we build on?

- Existing international standards and goals, e.g. United Nations Guiding Principles on Business and Human Rights⁶⁷;
- Experiences with existing EU law, e.g. Forest Law Enforcement, Governance and Trade (FLEGT)⁶⁸ to inhibit illegal logging and illegal

64 WTO Marrakesh Declaration of 15 April 1994; https://www.wto.org/english/docs_e/legal_e/marrakesh_decl_e.htm

65 See also COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Trade Policy Review –An Open, Sustainable and Assertive Trade Policy, COM(2021) 66 final

66 European Commission, Corporate Sustainable Governance, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12548-Sustainable-corporate-governance_en

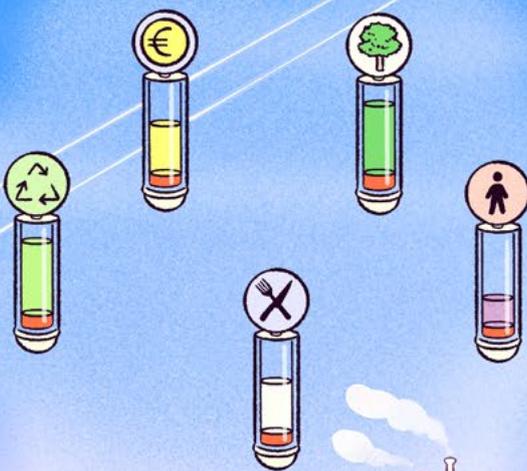
67 See United Nations Guiding Principles on Business and Human Rights (UNGP) https://www.ohchr.org/documents/publications/guidingprinciplesbusinesshr_en.pdf

68 Council Regulation (EC) No 2173/2005 of 20 December 2005 on the establishment of a FLEGT licensing scheme for imports of timber into the European Community

trade of timber, and experiences in other sectors such as steel, fertiliser;

- Existing multi-stakeholder initiatives such as for cocoa, palm oil, or timber should be critically assessed to identify and build on 'lessons to learn'. Existing private standardisation schemes could be a starting point. However, private standards might cover only specific products, and auditing might be required to avoid green washing;
- On-going discussions and forums at international level, in particular the Committee on World Food Security (CFS), FAO/WHO, Codex Alimentarius, WTO/SPS (Agreement on Sanitary and Phytosanitary Measures), United Nations Forum on Sustainability Standards (UNFSS). The involvement of 'front runners' (i.e. food system actors who are more advanced in their sustainability approaches) in multi-stakeholder forums could support the development of a more ambitious way forward.



A grid of small icons is located on the right side of the image. It consists of a 4x4 grid of squares, each containing a different icon. The icons include a recycling symbol, a tree, a person, a crossed fork and knife, and a Euro symbol. The grid is surrounded by other elements like a fan and a person.

5. Working together towards a sustainable EU food system - a visual



The illustration aims at capturing the key elements of the discussions in the context of this project. Most importantly, the illustration shows a place of dialogue between all the actors of the European food system to achieve its sustainability and translates visually abstract and complex concepts, such as transparency or policy coherence, which are necessary to move the food system towards sustainability.



Crucially, reaching a suitable balance between the five dimensions of sustainability used in this project requires establishing a forum of discussion, negotiation and cooperation between all actors.

The five-pan scale on the table represents this challenge with the beams pointing to the respective five gauges hovering in the sky, indicating the state of the different dimensions.



Everyone has a role to play to ensure a sustainable European food system. The seats in the amphitheatre are not taken permanently and actors come and go. However, some actors, spending more time at the central table, have more influence than others.

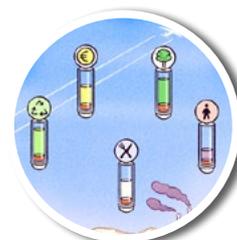


The remote controls in the actors' hands represent the shared responsibility in creating a sustainable food system.



In addition to the European dimension, symbolised by the flag on the ground, the global dimension is relevant, represented by the globe and the compass on top, showing the direction of travel.

The hourglass on the left-hand side on the table represents the urgency to act now for a sustainable food system.



6. Making the EU food system sustainable

Even though the purpose of this project is not to engage in the inherently political task of determining specific targets for the path towards sustainability, identifying time-bound, ambitious, quantified and progressively increasing targets reflecting the scientific understanding of actions is necessary to achieve a sustainable food system and contribute to achieving the Paris agreement and Green Deal Goals. Clear targets for a set of key sustainability indicators will be essential to give direction and monitor progress towards sustainability and to have a grasp on the implementation of any legislation for the sustainability of the EU food system. These indicators should be selected from each of the five dimensions of sustainability adopted here. Without pre-judging what these indicators should be or what targets should be applied, strong messages about the direction that the food system should follow to become sustainable have emerged.

A few of these elements are not specific to the EU food system and are widely accepted, such as the need to reduce greenhouse gas emissions massively, and to preserve and restore biodiversity. Others are specific to the EU food system. Beyond some targets already stated in the Farm to Fork Strategy, other suggestions have been made to translate general sustainability objectives into policy measures.

Promoting sustainable consumption

The provision of long-term food security in a broad sense for all is the ultimate objective of a sustainable food system. Ideally, all food products on the EU market should stem from production processes that comply with ambitious sustainability standards, so that, as currently for food safety, consumers would not have to

choose between products from sustainable or unsustainable production chains for healthy diets. As sustainability is much more complex to achieve than any of its individual dimensions in isolation (e.g. food safety), we probably will not reach that ideal for quite some time. Sustainability is also a dynamic concept and is likely to evolve with time. In the meantime, conditions need to be established that enable consumers to play an active role in making the food system sustainable (e.g. through participatory governance in (local) food systems, consumer supported agriculture schemes) and to choose a healthy diet (e.g. through improving the food environment²⁴). This calls for a strong engagement of public authorities at all governance levels.

While a healthy diet from a sustainable food system should be affordable, participants stressed that food policy should not be used as an instrument of social or income policies (regarding the aspect of keeping food prices low). Currently, the possible impacts of increasing the sustainability of food production and consumption on consumer food price and expenditure for food is not clear, and more evidence is needed. The average expenditure for food in the EU is quite low - 12.1% of total household consumption expenditure in 2018, but in some Member States, expenditure is significantly higher (up to 27.8%)⁶⁹. Despite the low average, financial measures (e.g. lowering income tax, VAT reduction) or targeted support measures for vulnerable population groups might be necessary if food prices increase, as well as more concrete information on who the vulnerable groups are and for whom more expensive food will create a difficulty (see also Section 4.4).

Food demand is a major influencing factor in the food system and the transformation to healthy diets from a sustainable food system

⁶⁹ <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20191209-1> ; within the EU27, expenditure for food and non-alcoholic beverages ranged from 8.7% in Ireland to 20.9% and 27.8% in Lithuania and Romania, as share of household consumption.

relies on a significant decrease of consumption (and consequently production) of animal-sourced foods, so-called ultra-processed foods, and foods and beverages high in sugar, salt and saturated fat in general. Although diets vary across countries and population groups, the ‘planetary health’ reference diet⁷⁰ provides guidance as well as considerations regarding the net *zero greenhouse gas* emission target and related remaining per capita budgets for greenhouse gas emissions for the food sector⁷¹. In this context, national dietary guidelines should be regularly evaluated and updated based on independent expertise, to progressively include all sustainability dimensions⁷². It might be useful to harmonise the basic features of such guidelines at EU level, while considering relevant national and regional aspects.

The ‘food environment’²⁴ has emerged as a key concept in the transition towards a sustainable food system. An enabling food environment, ensuring easy access to healthy diets from sustainable sources, is thus an essential element of a sustainable food system and recognises the limits of consumer autonomy. Aspects of the food environment, which can be seen to encompass seven dimensions⁷³, are discussed in several chapters of this reflection paper; a recent assessment of EU policies regarding the food environment, including policy recommendations, has been prepared by Djojosoeparto et al.⁷⁴

Introducing transparency and true costs approach across the food supply chains

70 Willett W. et al 2019, Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems, The Lancet, Volume 393, Issue 10170, [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4).

71 Our World in data, Hannah Ritchie 2021. Emissions from food alone could use up all of our budget for 1.5°C or 2°C – but we have a range of opportunities to avoid this; <https://ourworldindata.org/food-emissions-carbon-budget>

72 See e.g. the case of Denmark <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/Denmark/en>

73 The seven dimension are: food composition, food labelling, food promotion, food provision, food retail, food prices and food trade; see Swinburn et al. 2013 “INFORMAS (International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support): overview and key principles.” Obesity reviews 14 (Suppl. 1), 1–12, <https://doi.org/10.1111/obr.12087>

74 Djojosoeparto SK, Kamphuis CBM, Vandevijvere S, Harrington JM and Poelman MP on behalf of the JPI-HDHL Policy Evaluation Network. The Healthy Food Environment Policy Index (Food-EPI): European Union. An assessment of EU-level policies influencing food environments and priority actions to create healthy food environments in the EU. Utrecht, Utrecht University, The Netherlands, 2021

75 According to Yi et al (2021) farmers share is between 16–38% of consumer expenditure on food (2005–2015), for middle and high income countries; the share decreases for out of home consumption. Yi et al 2021 Post-farmgate food value chains make up most of consumer food expenditures globally. Nature Food 2, 417–425, <https://doi.org/10.1038/s43016-021-00279-9>

Sustainability performance needs to be measurable and monitored and the basic elements of the sustainability assessment framework (as proposed in Section 4.1) can provide a solid starting point for the development of a workable set of indicators and a dashboard to facilitate monitoring.

(Un)Sustainability should be reflected in the end price of food, with products from unsustainable production chains carrying a higher price (as long as certain practices and products are still applied or, as long as they are not yet banned, which is another option). An essential part of this price transparency is also the price composition, i.e. which share of the end price can be allocated to e.g. primary production, manufacturing and which slice goes to retail⁷⁵. Transparency about the true costs could also be used to establish barriers, in order to avoid that e.g. farmers are paid less than the actual true production costs, and marketing strategies (e.g. loss leaders) for unsustainable products are able to undercut the price of sustainable products. Furthermore, the true cost should inform review and adaptation of investments, subsidies and tax rates.

Ensuring effective technological innovation

Technologies are expected to play a significant role in the transition to a sustainable food system. Digital tools for precision farming, artificial intelligence in decision support systems, new plant breeding technologies, deficit irrigation, novel feed and food additives, closed-loop aquaculture,

novel foods, personalised food, 3D-printing, new packaging materials and so on – there are many technological developments and applications that could contribute to reaching sustainability of the food system. However, to make sure they deliver on sustainability objectives, new technologies require proper management. This includes objective science communication and citizen involvement, science-based risk assessment, efficient regulation and approval processes (avoiding regulatory bottlenecks), and appropriate integration into production systems.

More concretely, funding gaps for agro-food innovation for sustainability need to be closed, such as for example sustainable regenerative farming practices. Relevant new technologies should be accessible for small-scale enterprises (e.g. the further development of precision farming to increase resource efficiency should include applications for small plots to avoid leading to larger machinery promoting monocultures on large farms). New plant breeding technologies could help to increase productivity and resilience of crops, while reducing the environmental and climate footprint of farming. If managed well, these new technologies can promote diversity, a source of resilience and sustainability. If not managed well, they could promote monocultures and the dominance of a limited number of companies, or it could turn out that the technologies are not applied at all due to their rejection by the public. Furthermore, integration into production systems needs education, capacity building and support for knowledge sharing.

Technological innovation needs to be complemented with social innovation and institutional development. For example, water management institutions and water users associations complement technological development such as water-saving irrigation systems.

Reflections on possible ways forward targeting food system actors

The following presentation of participants' reflections on actions to improve the sustainability of the EU food system is organised per actor of the food system. It focuses mainly on the actors earlier identified as most relevant. This does not imply that other food system actors (such as the upstream part of the chain/ input suppliers) should not be considered. This section is a compilation of input provided in different rounds of discussion throughout the process. It is not intended to be comprehensive or balanced across actors (e.g. some measures such as pricing of externalities is mentioned in the context of farmers but are also relevant for other actors of the food system). The reflections also take up aspects of these current key actors' behaviours and respective drivers that have been identified as compromising the sustainability of the food system (see Chapter 3).

Furthermore, it should be understood that no single action will be sufficient to significantly improve the sustainability of the EU food system. Instead, many changes, adaptations, transformations including innovative processes, and products will be needed at all levels and in a coherent sequence to be able to move forward. Hence the importance of strong coordination and coherence between different measures (including different types of approaches such as voluntary, mandatory) and policy areas. In addition, although, according to current understanding and data availability, the majority of current negative impacts of the food system are documented at the level of primary producers and consumers, more attention needs to be given to the actors in the food system with more agency (i.e. more ability to take action or to choose what action to take), in particular retailers, food manufacturers and finance⁷⁶.

⁷⁶ However, the different sectors are not homogenous, and SMEs in the food manufacturing or retail sector do not necessarily have a strong influence in the food system.

Reflections on actions to improve sustainability, focusing on farmers

Sustainable farming practices: Strengthen the knowledge base on environmentally friendly, productive and regenerative farming practices; facilitate uptake of practices and alternative inputs (e.g. fossil energy-free fertiliser); invest in metrics to measure farm-level performance (e.g. on biodiversity, soil organic carbon) and enable farmers to measure, record and innovate; preferentially apply outcome-based approaches to allow for alternative pathways towards agreed targets, agroecology/regenerative farming could be set as a key principle for agricultural production (although a widely accepted definition of what it means and includes is still lacking); couple public payments more closely to the provision of public/environmental services (stronger alignment of CAP to a sustainable food system); long-term conservation contracts (possibly funded by higher VAT rates for food from unsustainable production systems) could support farmers who want to go beyond legal obligations; the definition of what practices are sustainable or unsustainable could provide a basis for possible incentives and bans (and the development of better alternatives)⁷⁷;

Regional balance: Concentration of certain types of production in limited geographical areas contributes to negative environmental impacts, in particular intensive livestock farming. Decentralising and diversifying production and processing facilities could reverse these negative impacts and also support regional development and contribute to overall resilience.

Advice: Establish a quality and affordable advice structure that is independent from private commercial interests.

Pricing externalities: Establish emission rights (e.g. for greenhouse gases and e.g. ammonia), either as a quota or as an emission trading scheme for the food system/for agriculture (possibly linked to the size/turnover of the farm); similar approaches could be applied for water usage and biodiversity.

Access to land: Build on approaches such as the French '*sociétés d'aménagement foncier et d'établissement rural*' (SAFER)⁷⁸ to link agricultural land access to sustainable farming practices and rebalance the land market in favour of sustainable farming.

Empowerment of farmers: Support the establishment of alternative market outlets to diversify possibilities for farmers to sell their produce (e.g. short supply chains, direct sales to consumers); adapt competition policies to strengthen farmer organisations and cooperatives in price negotiations; invest in training and skills development of farmers to facilitate uptake of different farming practices, new technological approaches, and alternative market outlets, and to enable sustainable entrepreneurship; support schemes to attract young people to farming as well as rewarding employment creation (in particular for small farms) to sustain farming diversity⁷⁹; support schemes to facilitate a re-orientation of production to meet sustainability objectives or to compensate for the loss of livelihoods (e.g. in the case of livestock farming reductions).

Nutrition transition: Support the diversification of EU produce and the transition to a more plant-based diet with e.g., support to improve farming approaches, market and infrastructure for legumes for food. Alternative protein sources such as insects could also further broaden the production and dietary spectrum.

⁷⁷ See also JRC work on best environmental management practice in the agriculture sector (2018) at <https://susproc.jrc.ec.europa.eu/activities/emas/agri.html>

⁷⁸ SAFER: sociétés d'aménagement foncier et d'établissement rural <https://www.safer.fr/> A SAFER is a public limited company, not for profit (without profit distribution), with missions of general interest, under the supervision of the Ministries of Agriculture and Finance. SAFER develops agriculture, but it also protects the environment, landscapes and natural resources such as water, and supports local authorities in their land projects. [translated from website, accessed 30 June 2021]

⁷⁹ There is a territorial dimension - in regions with too much concentrated agriculture that is unsustainable, production needs to be reduced for environmental reasons. Low incomes on smaller farms in such areas are a signal that labour should move to other sectors (at least part time), filling labour gaps in other sectors (health, energy transition).

Reflections on actions to improve sustainability, focusing on fishers & aquaculture farmers

European demand for fish and seafood is largely met through imports, accordingly trade plays an important role. Wild capture fisheries can be compared to hunting, while aquaculture is more similar to farming. Sustainable 'blue foods'⁸⁰ could be a cornerstone of a sustainable food system. The Common Fisheries Policy already includes sustainability as an objective; the full implementation of existing rules should be strengthened. Furthermore, supporting low impacting fishing practices and the promotion of less commercial and consumer-known species, as well as a greater seasonality of fish, respecting reproduction cycles, could contribute to increase the sustainability of fishing and thus fish consumption in the EU. Allocation of fishing rights and a decrease of duties linked to sustainability criteria, increased taxes on fossil fuel for fishing in international waters, more environmentally friendly fishing gear (more selective and non-habitat destructive), smaller fishing vessels with less environmental but more positive social impact, better respecting the quality of fish that is sold at a higher price etc., could provide a strong incentive for changing behaviour.

Reflections on actions to improve sustainability, focusing on food and drink manufacturers

Manufacturers should contribute to the sustainability of the food system by choosing their suppliers according to their overall sustainability performance (including transport)

and by establishing fair contracts with them (full enforcement of the Directive on Unfair Trading Practices⁸¹), as well as changing other unsustainable practices. Establishing mandatory due diligence based on the United Nations Guiding Principles on Business and Human Rights⁶⁷ and environmental issues could contribute. A change of paradigm is necessary - growth and profit should be the reward for a socially and environmentally sustainable business model and not the main objective of a business model. A quota system could be an option to progressively increase the share of raw materials in food manufacturing coming from sustainable sources (e.g. an obligation to purchase a certain percentage of produce from primary producers meeting the highest sustainability standards⁸²). The use of more diversified and local ingredients (from sustainable sources) could be considered. But also manufacturing processes need to become environmentally sustainable, increasing their energy and water use efficiency (e.g. re-use of water), making the most of the raw materials and ingredients and ensuring alternative applications for non-usable fractions.

Processing and nutritional quality of food: Excessive consumption of food products high in sugar, salt and saturated fat is a major concern in the context of unhealthy diets. Also other industrial practices raise issues, especially with regards to ingredients (e.g. related to their nature, quality, origin). Reformulation of food products should be incentivised, e.g. via targeted taxes to make the products most susceptible to lead to unhealthy diets sufficiently more expensive in order to influence purchasing behaviour (e.g. sugar tax, fat tax; effectiveness

80 Blue foods are defined as 'All edible aquatic organisms, including fish, shellfish and algae from marine and freshwater production systems (aquaculture and fisheries)'. <https://www.bluefood.earth/>

81 DIRECTIVE (EU) 2019/633 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 April 2019 on unfair trading practices in business-to-business relationships in the agricultural and food supply chain; <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019L0633>

82 Similar obligations could apply to other actors such as the hospitality sector, procurement. See approaches for petrol (5% or more bioethanol; see for information on biofuel shares in transport fuels in the EU Patias et al 2020 Fuel quality monitoring in the EU in 2018, Eionet Report -ETC/CME 9/2020) or cars (minimum quota of e-vehicles; for example see EU Clean Vehicles Directive with national targets set for public procurement, https://ec.europa.eu/transport/themes/urban/clean-vehicles-directive_en). However, there could be a risk of leakage of less sustainably produced raw materials to third countries. Furthermore, implications on competition rules and freedom of business principles might need to be considered.

depends on modalities of each tax) and front-of-pack nutrition labels (increasing awareness and a more informed choice, an action foreseen under the Farm to Fork Strategy). A carefully designed nutrition and/or sustainability score could be introduced that allows to increase performance over time (and to avoid pitfalls encountered in current systems).

Marketing: Marketing of foods high in sugar, salt and saturated fat and more generally of food products sometimes considered as ‘ultra-processed’ should be restricted to minimise their exposure to children, on both traditional and digital channels (e.g. social media influencers). Marketing could be linked to a minimum nutrition profile or sustainability score.

Sustainable transport and logistics: A centralised cross-company management of transport could contribute to the reduction of transport emissions by avoiding empty truck returns, in addition to a more general decarbonisation of the transport sector and development of functioning alternative transport networks (e.g. a rail network for freight). The decentralisation of storage, distribution centres, and processing and production could further contribute to reducing transport emissions.

Reporting obligations: Existing reporting obligations and corporate responsibility schemes should be strengthened to cover all relevant sustainability criteria, including obligations to report on the sustainability of inputs.

Fair employment: Fair, living wages and employment conditions need to be ensured for all stages of the food supply chain, including sub-contractors of food processors (e.g. contractors for slaughterhouses).

Competition policy: Consumer food price (largely set by retailers) should not be considered to be the sole consumer welfare outcome to be taken into account. Furthermore, to ensure a balance of

market power, food manufacturers and retailers should be recognised as competitors in terms of food manufacturing, i.e. retailers should be considered as food and drink manufacturers in relation to their private label products.

Reflections on actions to improve sustainability, focusing on retailers

Retailers need to contribute to the sustainability of the food system by choosing their suppliers according to the overall sustainability performance and by establishing fair contracts with them (in particular farmers, full enforcement of the Directive on Unfair Trading Practices⁸³; long-term advance procurement and necessary adjustments for high price fluctuations). The effects of retail concentration, e.g. of European retail alliances, on the sustainability of the food system might need further consideration⁸³. Retailers are a central part of the food environment of consumers and have a certain responsibility for the healthy and sustainable consumption of their clients. E-commerce and direct delivery, as well as supermarkets run by consumer cooperatives might allow for a diversification of actors in food retail. Generally, urban planning should consider retail outlets and their diversification, to ensure diversity and to avoid the creation of food deserts.

Quality of food offered: The retailer, in particular larger supermarket chains, could be obliged to ensure that they offer a certain share of products with a high sustainability score (including nutritional aspects) on the basis of schemes to be developed. This could develop into a competitive advantage for consumers (and platforms could be established where information on different sustainability approaches by retailers could be provided to consumers). Already today, retailers establish contracts with their providers (e.g. zero-pesticide residues), and longer-term secure contracts could be linked to the adherence to certain practices.

⁸³ See e.g. Colen, L., Bouamra-Mechemache, Z., Daskalova, V. and Nes, K., 2020, Retail alliances in the agricultural and food supply chain, EUR 30206 EN, Publications Office of the European Union, Luxembourg, doi:10.2760/33720,

An EU sustainability label and score could provide necessary harmonisation and could offer a mechanism to increase sustainability ambitions. Retailers could develop nutrition and sustainability filters for their online product assortment, making the healthy and sustainable choice easier for consumers. Also, the food provided to food banks should comply with the requirements of sustainable and healthy diets. Retailers could be benchmarked according to the sustainability of their offer.

Diversity of offer: Retailer requirements can lead to an increased food loss and waste when produce does not comply e.g. regarding size and visual attractiveness of food. Allowing for more diversity, also including different varieties of fruits, vegetables and fish could benefit the environment and the consumer. Attractive and sustainable alternatives regarding food (e.g. alternatives for animal products) and different retail options (alternative providers) could improve the food environment and enhance sustainable choices for consumers.

Marketing: Marketing strategies by retailers influence consumer choices and could be more geared towards healthy diets from sustainable sources, supported by regulation. This relates to offering and discounts for food products with a high environmental footprint, and to the store layout favouring impulse buying of foods high in sugar, salt and saturated fat and more generally of food products sometimes considered as ‘ultra-processed’, as well as discounts for such food products, potentially misleading labels, targeting children etc. In addition to traditional marketing channels, online marketing (including social media) need to be restricted regarding children’s exposure too. Retailers can also use their marketing power to educate customers to cook healthy meals with a low environmental footprint (e.g. provide vegetarian recipes).

Information to consumers: Retailers have a big responsibility in terms of providing information

to consumers. Digital technologies could provide additional tools to offer information to consumers in the shop and online about the sustainability of products in an easily accessible way.

Food waste: Reduction of food waste is a recognised need and the setting of targets is foreseen under the Farm to Fork Strategy. Apart from the foreseen revision of the rules on date marking in the EU (‘best before’ and ‘use by’ markings), increasing the opening days of retailers to 7 days per week was considered as a complement to help avoid food waste (but this would have implications on working conditions, and shops opening 7 days a week exists already in some Member States). Investments in less packaging and in sustainable packaging could reduce packaging waste and reduce the impact of food packaging. For both approaches possible implications for food waste need to be considered. Furthermore, national rules regarding food donation could be revised in order to facilitate and encourage food donations by retailers and thus reduce food waste.

Reporting obligations: Existing reporting obligations and corporate responsibility schemes should be strengthened to cover all relevant sustainability criteria, including obligations to report on the sustainability of inputs.

Resilience: Contingency plans should be in place (action included in the Farm to Fork Strategy). Reduction of on-time delivery in favour of more local storage could decrease transport emissions and increase resilience.

Reflections on actions to improve sustainability, focusing on consumers

Consumers have a key role to play regarding the sustainability of the food system. However, individual actions only become effective if a critical mass of consumers start behaving in a similar way. This can be triggered by a relatively small number of consumers.

Food literacy: Knowledge about food, where it comes from, how it is produced and its sustainability performance, food labels, what constitutes a healthy diet, and the ability to cook are essential for enabling consumers to choose a healthy diet from a sustainable food system. School curricula should include the food system and cooking, and there should also be education on offer for adults. Public procurement and school food can also educate and promote healthy diets.

Social factors and lifestyle: Convenience is one of the drivers for unhealthy diets; limited time available for food choice and preparation increases the consumption of convenience food. Also, current consumer preferences such as choosing only the best pieces of meat, or most perfectly shaped fruit and vegetables are linked to increasing food waste. Positive role models could promote behaviour change and sustainable and healthier diets. As out-of-home food consumption and meal delivery services increase (about 20-30% of total food consumed is not purchased in grocery shops but comes from restaurants, canteens and other services), these food sources need to be included in the sustainability assessment.

Mobility: Using the car for grocery shopping is a source of greenhouse gas emissions. Apart from more efficient trip planning by the consumer, town planning could contribute to provide other means of transport, or ensure that there is quality food availability at short distance (e.g. 15-minutes-city concept⁸⁴). E-commerce and delivery might reduce private trips to the supermarket, but comparative reduction of emissions needs to be assessed, as well as other possible externalities (congestion, road safety).

Information: More information and awareness about seasonality of fresh food (complemented

in the future by a sustainability score or a higher price tag for high footprint options) could contribute to environmentally sustainable diets. In conjunction with education and a general effort to increase food literacy, this could have a significant effect on the sustainability of diets. Furthermore, diversification of retail outlets could be supported with the establishment of platforms to provide consumers with information on e.g. direct sales by local producers. A state-controlled certification of restaurants that support organic produce could be used to promote sustainable food and meals (as is done in Denmark⁸⁵).

Food support: Public support to combat food poverty should by default aim at promoting sustainable and healthy diets, and measures should not be stigmatising. Food stamps or vouchers could for example be linked to farmers markets, so that fresh produce can be purchased. Healthy diets are also a disease prevention tool and medical doctors could provide prescriptions for cooking classes including vegetarian dishes for example⁸⁶ (and doctors might benefit from more knowledge about nutrition). The root cause of food poverty, i.e. socio-economic inequalities need to be tackled, and, ideally, higher wages, or changes in the income tax system should balance higher food prices. Along the same lines, shifting taxation from income to consumption would contribute substantially to changing incentives in the food system (and not only there).

Reflections on actions to improve sustainability, focusing on finance

The finance sector is a very relevant actor in the food system, be it via determining the conditions for financing investments or the role of shareholders influencing companies' strategic

⁸⁴ The 15-minute city refers to an urban concept ensuring that all residents can meet most of their needs close to home.

⁸⁵ <https://www.organicdenmark.com/organic-cuisine-label>

⁸⁶ See e.g. <https://www.hsph.harvard.edu/news/hsph-in-the-news/doctors-patients-healthy-cooking/>

decisions (see e.g.⁸⁷) or other actions.

The participants of this project made reference to the EU taxonomy (i.e. a classification system of environmentally sustainable economic activities) as a possible way forward to ensure that financial firms include sustainability in their procedures and re-orient investment according to sustainability objectives⁸⁸. A recognised financial accounting standard, that includes social and environmental externalities could facilitate the development of a sustainable financial sector.

Care needs to be taken that respective sets of sustainability standards are compatible with the sustainability assessment framework to be developed for the food system. Furthermore, existing frameworks, such as due diligence and the Environmental, Social, and Corporate Governance (ESG) framework, should be adapted to include the sustainability criteria relevant for sustainable food systems.

Conditional loans could provide another avenue for emphasising sustainability. Criteria for loan applications could be broadened to include relevant sustainability criteria, and higher interest rates could be considered for less sustainable entities, providing an incentive to improve sustainability performance.

Project development assistance schemes could build the needed capacity to improve the bankability of projects/investments in sustainability matters (e.g. climate change mitigation and adaptation, biodiversity conservation and regeneration). Investments in ESG-positive projects could be incentivised through fiscal stimulation, and government guarantees could support investments in high-risk projects with potentially high environmental and/or social impact. Offshore companies could be banned from investing in unsustainable activities in the EU.

The introduction of a cap on speculation with food

could reduce related food price hikes, but might be difficult to measure and control.

Reflections on actions to improve sustainability, focusing on public procurement

Public procurement needs to comply with competition rules which usually put price forward as the main decision criterion. The inclusion of a larger set of sustainability criteria would allow for procurement to take into consideration a more comprehensive set of additional aspects, including also local products and nutrition criteria (e.g. proportionality of dietary components *vis-à-vis* dietary guidelines).

Without a sustainability assessment framework in place, the development of an effective tender to buy food for sustainable and healthy meals poses difficulties, not least because of the many currently existing different certification schemes. A network of procurement officers and institutions from the regional to international level could help to share knowledge and best practices and would contribute to increasing the demand for sustainable food products.

⁸⁷ <https://theconversation.com/danones-ceo-has-been-ousted-for-being-progressive-blame-society-not-activist-shareholders-157383>

⁸⁸ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU Taxonomy, Corporate Sustainability Reporting, Sustainability Preferences and Fiduciary Duties: Directing finance towards the European Green Deal; COM (2021) 188 final



7. Conclusions

In this project the European Commission's JRC collected intelligence through an inclusive participatory process from a wide range of participants with knowledge and understanding of the food system. The aim was to reflect on possible key elements (building blocks) that could underpin a legislative framework for sustainable food systems.

From the many discussions among the participants throughout this project, a number of clear points have emerged:

Importance of non-financial dimensions of the EU food system: The current EU food system is mainly characterised by a pre-dominant focus on one dimension of sustainability, i.e. most of the attention is on the economic dimension, and (short-term) economic gains and growth, while ensuring a high level of food safety. However, to become sustainable there needs to be a paradigm shift, away from a productivist view⁸⁹ and towards the ultimate purpose of the food system, i.e. long-term food security in a broad sense⁹⁰ for everyone in the EU, without the current threats to the environment and people. A precondition for long-term food security is an EU food system that is sustainable and that does not compromise food systems and food security elsewhere. This change of mind-set is one of the strongest levers for system change⁹¹. It will also have a bearing on food policies, implying an emphasis on empowering consumers/citizens and creating enabling food environments, in addition to a balanced consideration of all three dimensions of sustainability – environmental, social and economic.

Urgency of action. The size of the challenges linked to the current food system that society is

facing and the limited time available to change course are such that action needs to start now (especially in relation to climate change and biodiversity). The legislative framework for a sustainable food system, introduced in the Farm to Fork Strategy, will be a key instrument to guide the transition towards sustainability. However, while the framework is to be presented by the Commission by the end of 2023, and given the estimated timeline of the legislative processes with the co-legislators that needs to be followed, resulting in the final adoption, this framework might not enter into force before 2025. If possible, actions should already be taken earlier, i.e. without the framework being in place (and some actions are already part of the Farm to Fork Action Plan), building on existing structures, policies and available knowledge of the food system. Necessary change should start without delay.

Systems approach & coherence. A successful transition of the food system towards sustainability requires a true systemic approach capable of embracing the complexity inherent to the system. No single policy or policy measure will be sufficient to manage, or even engage the transition. Instead, a broad range of actions coordinated across many policy areas (from fisheries and agriculture to health, social, trade, competition, environment, research and innovation etc.) must be taken, to result in system (and overall behavioural) change. Coherent governance at all levels will be crucial for the implementation, and appropriate institutional structures need to be developed. A successful sustainability transition will require simultaneous changes in a range of factors, across a range of sectors (including technology, production processes, food environments, consumption etc.).

89 The productivist paradigm emphasises the production of large amounts of inexpensive staple foods. See e.g. Gaitán-Cremaschi et al. Characterizing diversity of food systems in view of sustainability transitions. A review. *Agron. Sustain. Dev.* 39, 1 (2019). <https://doi.org/10.1007/s13593-018-0550-2>

90 Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. (1996 World Food Summit); ; a broader understanding of food security including agency and sustainability has been put forward by e.g. HLPE (2020), Food security and nutrition: building a global narrative towards 2030. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. <https://www.fao.org/3/ca9731en/ca9731en.pdf>

91 Meadows D., *Leverage Points: Places to Intervene in a System*, The Sustainability Institute, 1999.

This will require smart and integrated policies.

Inclusiveness. The transition of the food system towards sustainability is a societal task and its success will rely on the behaviour change and responsibilities of all actors in the food system. This must take potential conflicts of interest into account. New platforms, forums, experimental spaces involving all actors, and especially citizens, operating at all relevant levels (local, national and European) should be established and linked to enable new forms of interactions, the development of new approaches, sharing experiences, and, last but not least, the development of a shared vision for the sustainable food system of the future.

Mandatory approaches. While voluntary measures and agreements (such as the recent Code of Conduct on Responsible Food Business and Marketing Practices⁹²) might be useful in the short term as complementary approaches, substantial change needs the formulation of binding, ambitious and effective rules, which also provide certainty and necessary reliability for businesses through setting ambitious goals in combination with a practical timeframe.

Effective sustainability standards and targets. Sustainability of the food system is a broad, multi-dimensional concept which is difficult to grasp in all its details. Yet, it is possible to identify essential criteria for a sustainable food system and on this basis a robust sustainability assessment framework can be developed. This should enable the assessment of sustainability at the level of the system, which is the level that ultimately matters. It can serve as a reference to adopt effective sustainability standards and targets that should guide food production and consumption within the EU as well as trade relations with other countries regarding imports and exports of food products. These standards need to evolve over time to provide space for

adaptation, accordingly raise the ambition, and further reflect advances in the understanding of sustainability. The definition of sets of concrete targets that focus on desirable outcomes rather than on the prescription of specific (production) processes or approaches will be necessary.

A robust monitoring and evaluation framework. A sustainability assessment framework, (for which a possible starting point was developed in this project), could provide the basis for an operational sustainability 'dashboard'. Such a dashboard would facilitate the monitoring (and presentation) of data about whether the food system has engaged in its transition in the right direction at sufficient speed. It can lead to more understandable policy and operational landscapes.

Transparency. Transparency emerged as a core principle to mainstream sustainability in the food system. All actors, including policymakers, need to have relevant information and data to make informed choices (and feed the 'dashboards'). A transparency system needs to be established, along with harmonised definitions, rules, methods and compatible tools. It also needs an infrastructure (centralised or networked), and different interfaces and levels of access tailored to the information needs of each actor.

Agency, empowerment and responsibility. While all actors within the system need to do their part for sustainability, some actors have more agency (i.e. the ability to take action or to choose what action to take) than others. Currently, negative impacts occur largely at the level of primary production (e.g. environmental impacts) and consumers (health impacts of unhealthy diets). However, these actors are considered as having comparatively low individual agency, often responding to requirements or influence from other actors in the system. In particular, large

92 EU Code of Conduct on Responsible Food Business and Marketing Practices, https://ec.europa.eu/food/horizontal-topics/farm-fork-strategy/sustainable-food-processing/code-conduct_de

manufacturing and retail companies that have more influence on the food system and hold vast troves of data should be incentivised to share, guide and support suppliers and consumers in the journey towards sustainability. Specific attention needs to be paid to transparency. At the same time, consumers/citizens, whose food and nutrition

needs are the ultimate focus of a sustainable food system, should be empowered through the creation of enabling food environments, including appropriate education and information, and by supporting their access to healthy diets from a sustainable EU food system.





Annexes

Annex 1: List of participants

Surname	Name	Organization
Afonso	Ondina	Sonae MC
Allen	Ashley	Oatly
Annas	Peter	Lantmännen Group
Anny	Erwin	ECHA European Chemicals Agency
Antonelli	Marta	Barilla Foundation
Balazs	Balint	ESSRG, Environmental Social Science Research Group
Baldock	David	IEEP, Institute for European Environmental Policy
Bergmann Madsen	Betina	City of Copenhagen
Bonnet	Céline	Toulouse School of Economics
Brouckaert	Emiel	European Association of Fisheries Producer Organisations
Bruning	Tamara	Stad Gent
Buchholzer	Florence	European Commission, DG AGRI
Bush	Simon	Wageningen University
De Cunto	Anja	Eurocities
De los Rios	Enrique	Unica Group SCA
De Schutter	Olivier	UCL Université catholique de Louvain
Deconinck	Koen	OECD
Dzelzkalēja Burmestre	Maira	Farmers' Parliament (Zemnieku Saeima)
Ecker	Olivier	IFPRI International Food Policy Research Institute
Espinosa	Gaëlle	UN SDSN
Flore	Roberto	SkyLab-Food Lab
Frangoudes	Katia	Université de Bretagne Occidentale (UBO)
Grunert	Klaus G.	Aarhus University
Helderman	Sanne	World Benchmarking Alliance

Surname	Name	Organization
Hoogeveen	Ybele	EEA European Environment Agency
Hugas	Marta	EFSA European Food Safety Authority
Husu-Kallio	Jaana	Ministry of Agriculture and Forestry of Finland
Laurencin	Isabelle	Triodos Investment Management
Lazar	Ola	Foodtech accelerator
Mathijs	Eric	Katholieke Universiteit (KU) Leuven
Milone	Pierluigi	Organization Regione Molise, University of "Tor Vergata", DICA - University of Perugia.
Morrison	Jamie	FAO
Niggli	Urs	Institute of Sustainable Food and Farming Systems
Olper	Alessandro	Università degli Studi di Milano
Poppe	Krijn	Wageningen University and Research (emeritus)
Pushkarev	Nikolai	EPHA, European Public Health Alliance
Qaim	Matin	University of Goettingen
Terzi	Lorenzo	European Commission, DG SANTE
Tisenkops	Talis	University of Latvia
van de Pas	Ika	Milieucentraal
Vandewaetere	Bart	Nestlé
Varela-Ortega	Consuelo	Universidad Politécnica de Madrid
Wickramasinghe	Kremlin	WHO
Wunder	Stephanie	Ecologic Institute

Annex 2 Sustainability assessment framework – criteria, indicators and data sources

(The table reflects results from a brainstorming largely inspired by today's EU food system; broad sustainability objectives derived from the SAPEA working definition of a sustainable food system¹)

FOOD SECURITY, SAFETY & NUTRITION		
Provides and promotes safe, nutritious and healthy diets to all EU citizens, without compromising the availability of nutritious and healthy food and diets for people living outside the EU		
SUSTAINABILITY CRITERIA	INDICATORS	POSSIBLE DATA SOURCES
Food security, and nutrition across the EU	<ul style="list-style-type: none"> ● Share of population in different BMI brackets (gender, age, ethnicity (where legal), country) ● BMI development per cohort ● Intake of calories per capita (MS level data sources, per population group) ● Intake of nutrients per capita (MS level data sources, per population group) ● Intake of micronutrients per capita and population group (e.g. iron, iodine, folic acid, vitamin, B12, etc.) ● Average dietary energy supply adequacy (%; 3-year average) ● Consumption (g) of e.g. high fat, trans fats, salt and sugar foods per capita (low SES, context food poverty) ● Average per capita consumption of legumes (and nuts) ● Share of high fat, salt and sugar foods on offer (retail, wholesale or cafeterias/restaurants) ● Share of highly processed food in the diet ● Animal proteins as % of overall protein intake per capita ● Commercial data (sales volume per capita estimated; household purchase data) ● Branded food composition indices (classification) ● % of population with diets according to national dietary recommendations ● Country's dietary gap (average deviation from an ideal balanced - and sustainable - diet) ● Incidence & prevalence of different diet-related non-communicable diseases ● Burden of non-communicable diseases in Disability-adjusted life years (DALYs) ● Non-communicable disease burden (deaths/DALYs) attributable to dietary risks (looking also at trends) ● Healthy Food Environment Policy Index (Food-EPI) ● Share of member states with national frameworks on local food culture, ethnic or religious food culture where legal ● Intake of additives ● Consumption of meat and animal-based products per capita ● Life expectancy and healthy life expectancy ● Cost of a healthy diet from a sustainable food system ● Expenditure on food (and non-alcoholic drinks) per capita - both in the home and outside the home. ● Proportion of food calories consumed outside the home 	<ul style="list-style-type: none"> ● Bring together national observatories on nutrition and food in Eurostat (e.g. France's Observatoire de la Qualité de l'Alimentation) ● WHO Childhood Surveillance Initiative (COSI) ● Health Behaviour in School-Aged Children (HBSC survey) ● European Centre for Disease Prevention and Control (ECDC) ● The Healthy Food Environment Policy Index (Food-EPI) ● European Food Safety Authority (EFSA) - national food consumption surveys, food recommendations, ● FAOSTAT (e.g. Suite of Food Security Indicators, updated Aug 2020) ● EUROSTAT (e.g. EHIS survey - Daily consumption of fruit and vegetables) ● National frameworks on local food culture ● Barilla Foundation Food Sustainability Index ● State of health in the EU ● Global Burden of Disease (GBD) study ● European health Information gateway (WHO): https://gateway.euro.who.int/en/ ● SDG2 indicators ● Consumer panels of food purchases (Kantar, IRI, Nielsen) ● WHO Healthy diet factsheet

¹ SAPEA, Science Advice for Policy by European Academies. (2020). A sustainable food system for the European Union. Berlin: SAPEA. <https://doi.org/10.26356/sustainablefood> , p. 68

	<ul style="list-style-type: none"> ● Availability of (nutritious) food vs standard needs (per capita) ● Theoretical degree of self-sufficiency (ratio of agriculture and fish output vs protein/calories needs) 	
Food security and nutrition outside the EU	<ul style="list-style-type: none"> ● Development of quantities and types of EU food and agricultural imports ● Development of quantities and types of EU food and agricultural exports ● Food safety score: Global Food Safety Initiative (GFSI) overall score for countries with a score below a threshold in the reference situation, weighted by trade flows with the partner countries. ● Trade impact on local food security ● Increase of spending contributing to projects and/or international institutions (e.g. WFP) working on the reduction of food insecurity in vulnerable countries ● Imports of fish oil and fish meal for aquaculture (feeding) from sources that could be used by local population (e.g. anchovies from Peru, Nile perch from Lake Victoria...) ● Availability of (nutritious) food vs standard needs (per capita) ● Per capita consumption of red meat and other animal-sourced products (average and per population segment) ● Impacts from the ‘triple burden of malnutrition’ and the ongoing ‘nutrition transition’ in many countries: <ul style="list-style-type: none"> ○ Undernutrition ○ Micronutrient deficiency ○ Obesity and other diet-related non-communicable diseases ● Annual prevalence of undernourishment (%) ● Average dietary energy supply adequacy (percent, 3-year average) ● Economic capacity (GDP per capita) ● Percentage of population with access to water ● Percentage of population with access to sanitation services ● Under-five mortality rate ● UNDP education index (% of population) 	<ul style="list-style-type: none"> ● EU and World Trade Statistics ● SDG2 and other SDG indicators ● Level of wasting and stunting among children ● FAOSTAT- Suite of Food Security Indicators (updated Aug 2020) ● World Bank ● WHO/ UNICEF ● UNESCO
Food safety/Foodborne disease burden	<ul style="list-style-type: none"> ● Incidence of foodborne diseases (acute and late onset, e.g. from chronic exposure to contaminants) ● Incidence of zoonoses ● Use of antibiotics ● Occurrence of contaminants in food and food packaging ● Incidence of food allergies ● RASFF notifications ● Livestock/fish density ● Number of novel food applications ● Impact of pollution on production and products 	<ul style="list-style-type: none"> ● EFSA, list of food allergens, data ● RASFF ● The European Union One Health 2019 Zoonoses Report (published in Feb 2021): Zoonoses, antimicrobial resistance and food-borne outbreaks ● WHO – Estimating the burden of foodborne diseases: A practical handbook for countries (published on 07/06/2021) - Relevant data sources in the annexes ● EFSA/ECDC/EMA European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) report ● Future monitoring under the Veterinary Medicines rules
Antimicrobial resistance	<ul style="list-style-type: none"> ● Use of antibiotics at farm level and sales data per: <ul style="list-style-type: none"> ○ Antibiotics family (with special focus on antibiotics that are, or may in the future become, critically important for human medicine) ○ Animal species 	

	<ul style="list-style-type: none"> ○ Type of use (with special focus on monitoring the development of sales of antibiotics destined for use in group treatment) ○ Farming system (livestock/fish; to establish if there are common trends in use between e.g. indoor, free range, organic systems) ● Use and sales of veterinary feed additives and other veterinary substances with similar properties to antibiotics, especially those that may involve horizontal transfer of resistance 	
Non-food borne infectious diseases	<ul style="list-style-type: none"> ● Incidence of non-foodborne infectious diseases directly related to food production 	<ul style="list-style-type: none"> ● EFSA ● ECDC ● European Environment Agency (EEA) ● European Agency for Safety and Health at Work (OSHA)
Relevant environmental health impacts	<ul style="list-style-type: none"> ● Levels of air pollution attributable to agriculture (e.g. Particulate Matter 2.5). 	
Occupational health	<ul style="list-style-type: none"> ● Injuries in the workplace ● Health burden of occupational exposure to agrochemicals ● Rate of non-communicable diseases (NCDs) among (sea) farmers, fishers, and agricultural workers (incl. musculoskeletal disorders). 	

ENVIRONMENT

Low environmental impact, protects and restores the natural environment

Indicators of pressure		
SUSTAINABILITY CRITERIA	INDICATORS	DATA SOURCES
Land use / land use footprints / total land used by EU food system/Soil erosion exhaustion and contamination / land productivity	<ul style="list-style-type: none"> Gross and per capita ecological footprint of EU food consumption Total land use/land occupation within and outside EU for EU food consumption (incl. feed) Total land use for EU agriculture Land productivity (crop yields) Soil health (biological and chemical) quality indicator Percentage of land use for food production Shares of different types of land use Proportion of agricultural area under productive and sustainable agriculture Number of farms adopting precision agriculture techniques and linked reduction of external inputs use (in %, fertilizer, pesticides) Carbon sequestration capacity per ha Maintenance of permanent grasslands Soil organic carbon (SOC) stock SOC sequestration rates per area Soil loss per ha.year per type of landscape Impact on land use and land use change abroad (e.g. induced deforestation) Share of land under different production systems (e.g. organic) Presence of soil pollutants, excess nutrients and salts Soil structure including bulk density and the absence of soil sealing and erosion Soil biodiversity Soil nutrients and pH 	<ul style="list-style-type: none"> European Environment Agency (EEA) Develop new soil health indicators Develop soil carbon sequestration capacity indicators Need for soil biodiversity metric EUROSTAT FAO - Global Soil Partnership EU Common Agricultural Policy indicators For water scarcity, i.e. context-based water targets: https://wwf.panda.org/discover/our_focus/fresh_water_practice/water_management/science_targets_water/ AQUASTAT EU Water Framework Directive FAOSTAT UNESCO, UN-Water, 2020: United Nations World Water Development Report 2020: Water and Climate Change, Paris, UNESCO. MS National Statistics Yale Center for Environmental Law and Policy (YCELP), Yale University; Center for International Earth Science Information Network (CIESIN), Columbia University; World Economic Forum (WEF), and Joint Research Centre (JRC), European Commission. 2005 Environmental Sustainability Index (ESI). Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC); https://sedac.ciesin.columbia.edu/data/collection/esi; https://doi.org/10.7927/H40V89R6 Many existing indicators - General data on the use of green, blue and grey water for production is available for some crops like rice Indicators developed under existing EU legal instruments should be used. Link to SDG target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity. Open source multilevel water footprint dataset of food commodities to capture e.g. % of crop type in an area dependent on full/partial irrigation, water saving technologies etc., trends in water use in agriculture over time, by crop/region; proportion of nutrient pollution in fresh water attributable to livestock and more general farm production Petersson et al 2021 A multilevel carbon and water footprint dataset of food commodities; https://www.nature.com/articles/s41597-021-00909-8
Seabed	<ul style="list-style-type: none"> Surface of aquaculture farms implemented in sensitive or protected habitat 	<ul style="list-style-type: none"> Fisheries and aquaculture data (Eurostat, EUMOFA, FAO, SOFIA – State of world fisheries

<p>use/marine ecosystems footprints</p>	<ul style="list-style-type: none"> ● General/remote impact of aquaculture on critical marine habitats ● Impact of fishing on critical marine habitats/ecosystems ● Impact of the gear on seabed: Risk Based Assessment (RBA) by fishing gear (step 1); RBA based on habitats (step 2) ● Availability of space for sustainable fisheries, fishing effort matching local ocean productivity ● Plastic pollution and ghost fishing (lost gears) 	<p>and aquaculture report)</p> <ul style="list-style-type: none"> ● EU Marine Strategy Framework Directive MSFD - pressure indicators ● Benthis (Project on seabed impact of fishing gears, https://www.benthis.eu) ● European Environment Agency (EEA) ● EUROSTAT
<p>Water use / water footprints (water use, management, allocation & access, stress)</p>	<ul style="list-style-type: none"> ● Percentage of total water resource used for food production. ● Existence of water management plans ● Water use efficiency ● Agricultural water use ● Agricultural water productivity ● Freshwater withdrawal as a proportion of available freshwater resources ● Area under Integrated Water Resources Management ● Process water needed per kg of food processed (industry) ● Percent of irrigated area to Total Agricultural Land ● Percent of irrigated area under water saving technologies / Percentage of deficit irrigation/water saving techniques ● Water quality indicators ● Environmental Sustainability Index (ESI) (for Water Quality) ● Water stress (proxy for quality and pollution, not scarcity) ● Virtual water imports (l/kg) [Blue and green water footprints], virtual water net imports ● Agricultural water withdrawal as a percentage of total renewable water withdrawal ● Agricultural water footprints (production, consumption) ● Criteria in food procurement that lower water footprint (considering blue water component) 	
<p>Air, water and soils pollutions</p>	<ul style="list-style-type: none"> ● Water quality: <ul style="list-style-type: none"> ○ Chemical quality ○ Biological quality ○ Levels of nitrates in water 	
<p>Use and recycling of food and beverage packaging</p>	<ul style="list-style-type: none"> ● Collection & recycling infrastructure for key packaging materials (paper, aluminium, compostable, plastics: PET/PE/PP) ● Recycling target ● Recycled content in packaging ● Harmonised recycling information across EU 	
<p>Deforestation and reforestation</p>	<ul style="list-style-type: none"> ● Ha of wetlands/peatbogs restored ● Ha of wetlands/peatbogs degraded/drained ● Ha of forest restored according to best reforestation practice (e.g. not single tree species) ● % of protected forests ● Level of deforestation in different geographical areas, including those with significant food production 	<ul style="list-style-type: none"> ● EEA ● International indicators ● Technology providers such as google ● See quantis LUC/Nature Based work ● RAMSAR Convention ● UNESCO

	<ul style="list-style-type: none"> ● Conversion of forest to agricultural land (ideally to specific crops/grazing areas, relevant especially in areas of food production) ● Food supply chains at risk of being associated with deforestation (target: zero deforestation) ● Criteria in food procurement that prevent deforestation ● LUC impact – CO₂ from land cleared for production 	
<p>Impact on terrestrial and marine biodiversity & ecosystem services</p>	<p>MEASUREMENT OF BIODIVERSITY</p>	<ul style="list-style-type: none"> ● International standards (IPBES) ● EU protection goals and standards/Strategy plan for biodiversity 2030 ● SDGs 14 & 15 ● Sustainable development in the European Union - Monitoring report on progress towards the SDGs in an EU context, 2020 edition, EUROSTAT ● Impacts of tourism, human behaviour ● WWF or other international organisations ● ICES, GFCM and STECF
	<ul style="list-style-type: none"> ● % of protected/nature areas in the region ● Cohabitation between food production and achieving biodiversity objectives (and eventually tourism / leisure), in ha ● Number/surface areas of forests, natural parks - wild area indicator ● CFP objectives achievement ● Proportion of habitats, (especially agriculturally managed habitats) in “favourable conservation status” under the Habitats directive ● Trends in the population of relevant species groups e.g. farmland birds and butterflies ● Trends in the area of “High Nature Value “ farmland -collected in many MS ● Area and status of peatland/relevant wetlands ● % public procurement including criteria for sustainable fishery ● Share of fish landings caught at (level of) Maximum Sustainable Yield, MSY ● Biodiversity-friendly agricultural practices ● Use and preservation of local livestock breeds and old/local seed varieties 	
	<p>MEASUREMENT OF PRESSURES ON BIODIVERSITY</p>	
<ul style="list-style-type: none"> ● Mean ratio of mortality by fishing and mortality at MSY (trends) ● Impact of fisheries on ETP and sensitive species ● Unwanted catches and discards in fisheries ● CFP objectives achievement ● Excess reactive N and P in aquatic systems ● Red list index ● Existence of hedges ● Farmland Bird Index (C35) ● Share of cultivated land under agroforestry ● Share of wetlands under protection ● impact on marine food web: Score of the mean ratio of stock biomass over the mean equilibrium unfished biomass ● Aquaculture source of feeds (linked to raised species): Specific data on feed composition: raw marine or agricultural ingredients ● % public procurement including criteria that prohibit fish that are red listed ● Climate change ● Emissions of nutrients (N, P) ● Land use / land use change 		

Indicators of impact		
<p>GHG emissions (from energy, transport, land use, land use change, livestock, inputs, waste): carbon dioxide, methane, nitrogen oxides</p>	<ul style="list-style-type: none"> • Total greenhouse gas emissions in CO₂ equivalents per kg of food produced • Greenhouse gas emissions per activity or sector (e.g. per 100kg cereal produced, tonne of fish, etc.) • CO₂ emissions from EU agriculture, fisheries and food system as a whole • Average GHG emissions of EU diets • EU induced indirect land-use change effects in the rest of the world • % of public procurement containing criteria regarding transportation (No flight policy, Euronorm 6, green transportation...) and GHG-related sustainability criteria • Criteria in food procurement that lower carbon footprint • Carbon emissions: Total emissions as well as the degree of change in emissions in industry, transportation, and agriculture • Energy transition: The contribution of renewables to the overall energy mix and its recent historical rate of change • Net zero commitments for food supply chain stakeholders • Harmonised methodology for measuring and communicating to consumers 	<ul style="list-style-type: none"> • Country comparisons (of which EU MS) • CO₂ emission factors – clarify appropriate sources (e.g. IPCC, DEFRA?) • EDGAR - Emissions Database for Global Atmospheric Research (JRC) • Embodied GHG emissions in trade (e.g. based on trade flows and agreed LCA factors, e.g. Poore & Nemeck, 2018) • MIT Technology Review (2021) The Green Future Index 2021. A ranking of 76 economies on their progress and commitment toward building a low-carbon future. MIT Technology Review Insights, US • Internationally agreed criteria - Paris agreement, SDGs • A combination of territorial (as in EDGAR) and footprints is needed to capture the whole food system (which covers both production and consumption) • Agribalyse database (France) for main environmental impacts • Open source multilevel carbon footprint dataset of food commodities
<p>Use of pesticides and other toxic substances</p>	<ul style="list-style-type: none"> • Tonnages of toxic substances used (active ingredients, possibly per unit of food produced, including synthetic and natural toxins) • Acreage under alternative methods (e.g. bio-control, mechanical control, agroecology, etc.) • Acreage not under integrated pest management practices (IPM mandatory in EU) • Amounts of 'sustainable' pesticides applied (share of crop under agreed forms of IPM might be better) 	<ul style="list-style-type: none"> • REACH has tonnages produced for registered chemicals • Eurostat Agri-environmental indicators
<p>Fertiliser use and production</p>	<ul style="list-style-type: none"> • Emission of reactive N & P species to air and water (territorial and embodied in trade) • Level of cadmium in fertilisers • Level of heavy metals contamination from all inputs • Yearly tonnage of heavy metals discharged to soils in the EU (Cd, Cu, etc.) • Tonnage of 'new' nitrogen in fertilisers used • Tonnage of 'old' nitrogen used in fertilisers • Level of nitrification in surface water • Degree of eutrophication • Share of fossil-free fertiliser in fertiliser use • Nitrate levels in groundwater • Amount of N fixation by crops • GHG emissions related to fertiliser production • Levels of compliance with NVZ limits on nutrient application (170kg/ha etc.) 	

<p>Anti-microbial resistance</p>	<ul style="list-style-type: none"> ● Tonnage and types of antimicrobials used (specify according to use e.g. different categories of livestock) ● Level of antimicrobial resistance in environment ● Level of residues of AM substances in the environment (plants, animals, soil, sewage, etc.) 	<ul style="list-style-type: none"> ● ESVAC report
<p>Contamination of fauna & flora</p>	<ul style="list-style-type: none"> ● Bioaccumulation of contaminants in sentinel species 	
<p>Waste management /Food losses, food waste, food recovery/Waste prevention</p>	<ul style="list-style-type: none"> ● Use of biogas from waste (farm, industry, etc.) ● Use of biomass for energy (pulp, etc.) ● Amount of food waste generated in each part of the food system ● Use of food waste at production level for non-food products ● Number and size of outbreaks (animal and plant health) as causes of food losses ● Food waste at consumer level (e.g. consumers throwing food away because of sell by or best before date, lack of skills to cook leftovers, etc.) ● Food waste at retail and food service level ● Implementation of delegated act - food waste ● Amount of food loss on farm, with causes ● Reuse of recovered food ● EU food loss index ● Fisheries: Risk Based Assessment by 'plastic use-oriented' by pseudo-métier (fishing segment) ● Aquaculture: Waste disposal system per country ● Amount of foods made with by-products available in the markets ● % public procurement that takes into consideration how to prevent food loss and waste in the whole food system. ● Carbon footprinting of food waste 	<ul style="list-style-type: none"> ● EFBF ● UNEP Food Waste Report (2021) ● EU Platform on Food Losses and Food Waste ● Estimates of European food waste levels (FUSIONS, 2016) ● The revised Waste Framework Directive adopted on 30 May 2018 - Food Waste Measurement ● Europhyt

RESILIENCE

Robust, adaptable & transformable food system

Capacity to adapt

SUSTAINABILITY CRITERIA	INDICATORS	DATA SOURCES
Resilient governance	<ul style="list-style-type: none"> ● Availability of coordination tools and protocols for crisis response, e.g. forum under the contingency plan (average response time), AMIS ● Degree of tightness of the food system networks ● Existence of a food crisis response protocol in public authorities ● Partnerships along the food chain ● Sharing of information among stakeholders (production, industry, retailers) is of utmost importance regarding food availability and food chain resilience ● Implementation of sustainable public procurement policies and action plans 	<ul style="list-style-type: none"> ● Interesting but hard to measure
Diversification of farming systems (Ensure adequate food supply through diversity of food sources in the EU and strengthening of local production and regional value chains)	<ul style="list-style-type: none"> ● Food security indicators ● Degree of synergies between short and long supply chains ● Availability of long and short green lanes for logistics ● % of population affected by food insecurity ● Stock of a variety of seeds and commodities ● Degree of EU self-sufficiency in commodities 	
Logistic resilience	<ul style="list-style-type: none"> ● Storage of staples (t/capita) ● Geographic distribution of storage ● Current transport capacity ● Capacity to ensure transport capacity over the long-term ● Number of green lanes for food and feed transport across borders 	

Robustness

Diversification in agriculture, aquaculture and food processing	<ul style="list-style-type: none"> ● Crop and livestock diversification at regional level ● Number of crops and diversity of specific crop varieties over time), their shares in the total amount of arable land in a farm holding ● Types/percentage of land use for food production ● Reduced dependence on protein feed imports and reduction in virtual land area required for EU food consumption ● Availability of food storage and processing capacity ● Share of fallow land of all land under cultivation ● Livestock density per hectare ● Regional concentration of animal production ● Stocking densities in sensitive livestock, 	<ul style="list-style-type: none"> ● Eurostat: agricultural and agri-environmental indicators ● Crop diversification measures: JRC ● Eurostat for land use
---	--	---

	<p>especially pigs and poultry</p> <ul style="list-style-type: none"> ● Fish and seafood species allowing large scale production (filters/herbivorous vs carnivorous fish) ● Diversity of consumer demand (price, quality, taste, etc.) ● Resistance of infrastructures or crops/species to extreme weather events ● Independence from geopolitical and economic uncertainty ● Proportion of multitrophic aquaculture 	
<p>Diversity of the genetic pool of food plants, livestock and species in aquaculture farms</p>	<ul style="list-style-type: none"> ● Share of different types of agricultural species in total crop area (e.g. species diversity/concentration indices) ● Number of genetic varieties available and in use ● Share of crops with multiple useful traits (drought resistance, heat resistance, flood resistance, pest resistance, etc.) ● Population trends for rarer species/varieties worth conserving 	
<p>Territorial diversity (Territorial approach to food security and nutrition)</p>	<ul style="list-style-type: none"> ● Attractiveness of 'functional' (for food) landscape (tourism) ● Degree of regional autonomy in food supply (local self-sufficiency) ● Degree of diversifications of economic/productive activities in local/ regional/ national economy ● Share of direct sales relative to total food sales ● Share of regionally sourced food in public canteens 	

Economically viable food system

SUSTAINABILITY CRITERIA	INDICATORS	DATA SOURCES
Economic viability of businesses respecting sustainability criteria	<ul style="list-style-type: none"> • Area of production under 'sustainable' models (e.g. permaculture, regenerative, etc.) • Profitability of sustainable primary producers (income) • Market share of food distributors, processors, etc. operating according to sustainability standards • Profit sharing with retailers for 'sustainable' manufacturers • Trends in farm business size • Share of value of final product going to farmers (in all supply chains) • Public expenditure on conservation and sustainable use of biodiversity and ecosystems • Share of sustainable alternatives per product category 	<ul style="list-style-type: none"> • Eurostat (Inability to afford a nutritious meal every second day) • Need to define (broad) food quality criteria (nutrition, sustainability, welfare issues, etc.) • EU SILC survey • Basket of food products - Eurostat data - NUTS2 price level of food • EU Child Guarantee • Nielssen, Mintel
Access to capital, to best/advanced technology, land and vessels	<ul style="list-style-type: none"> • Level of subsidies harming sustainability • Level of payment for ecosystem services • Technology investments per turnover/hectare • Access to bank credit (hard to measure but an issue for farmers in CEE countries for example) • Amount/share of capital in the food system respecting the 'green taxonomy' 	
Affordability of a healthy diet (quality & quantity of food) [& food poverty] / Right to Food	<ul style="list-style-type: none"> • Price index of food, food commodity price stability mechanism • Number of people having a daily meal from food bank, NGOs, food vouchers and pre-prepared basket, food pantry • % of income spent on food (low socio-economic status; children; migrants) • Share of population with limited access to quality and diversified food products (including fruit and vegetables) – link to food environment • Cost of a sustainable and healthy diet • Number of people not having access to a nutritious meal every second day • % of children without access to adequate nutrition 	<ul style="list-style-type: none"> • Eurostat • National statistics
Fair distribution of added value along the food value chain	<ul style="list-style-type: none"> • Income/ added value distribution across food chain • Cost and risks distribution across the food chain • Added value for food system actors in all supply chain • Share of fair contracts • % public procurement including fair trading conditions (included in Public procurement criteria) • Number of complaints/cases in court • Increase of transparency across the value chain • Retail concentration (online & offline) per EU 	<p>See Unfair Trading Practices Directive e.g.:</p> <ul style="list-style-type: none"> • Payments later than 30 days for perishable agricultural and food products • Payment later than 60 days for other agri-food products • Short-notice cancellations of perishable agri-food products • Unilateral contract changes by the buyer • Payments not related to a specific transaction • Risk of loss and deterioration transferred to the supplier • Refusal of a written confirmation of a supply agreement by the buyer, despite request of the supplier

	<p>member state</p> <ul style="list-style-type: none"> ● Share of income generated per business partner 	<ul style="list-style-type: none"> ● Misuse of trade secrets by the buyer ● Commercial retaliation by the buyer ● Transferring the costs of examining customer complaints to the supplier
<p>Market standing of sustainable food/ true cost</p>	<ul style="list-style-type: none"> ● Market share of food with a meaningful sustainability label ● Number of patents applied along the supply chain ● Number of farmers-university led applicative research ● Share of labelled qualities in the food chain ● % public procurement including sustainability criteria ● Number of retailers, SMEs, producer organisations, initiatives affiliated to and respecting a sustainability certification scheme 	<ul style="list-style-type: none"> ● European patent office: PATSTAT dataset; from PATSTAT it is possible to measure the number of patents by sector and green technology, etc., at NUTS 3 level

FAIR, INCLUSIVE & ETHICAL

A fair, ethical, socially acceptable and inclusive food system

SUSTAINABILITY CRITERIA	INDICATORS	DATA SOURCES
Animal welfare	<ul style="list-style-type: none"> ● Share of animal products with high animal welfare quality standards according to stringent certification schemes ● Existence and uptake of method of production labelling schemes ● Existence and uptake of voluntary schemes ● Incidence of epidemics in livestock ● Share of antimicrobials used for growth enhancement ● Share of workers in animal production with a training in animal welfare (OIE standards) ● Livestock density ● Proportion of output meeting voluntary higher standards ● Proportion of products meeting organic standards 	
Fair employment conditions <ul style="list-style-type: none"> ● Living wages across the food system ● Stability of employment ● Just, safe and decent working conditions (including child labour, forced labour, schooling, health care, access to trade union, gender accessibility/equality) 	<ul style="list-style-type: none"> ● Distance of average wage in the food system to average wage in the economy ● BVDW % of farmers with living income (local and global supply chains connected to EU) ● Wage comparability (between different elements of the food system/ and against other sectors) [available at NUTS 2 level] ● Share and evolution of short-term and seasonal contract ● Turnover of workforce ● Job creation/job destruction ● Number of accidents in the workplace ● Share of employees with access to social security ● Equal pay - wage differences between men and women ● Fair treatment of men and women, local and foreign workers ● Share of employers in the food system adhering to International standards such as GRASP (agriculture) ● Number of Member States having ratified ILO conventions relevant to decent working conditions ● Numbers (and %) of extra-EU/migrant (regular and irregular) workers in agriculture ● Impact on ILO scores: ILO scores for countries with a score below a threshold in the reference situation, weighted by trade flows with the partner countries. ● Share of youth (e.g. under 35 years old) in agriculture, aquaculture and fishing 	<ul style="list-style-type: none"> ● FADN data currently available for jobs in agriculture ● check Generalised Scheme of Preferences (GSP) – Scorecards ● UN guiding principles for employment conditions ● ILO Convention on decent working conditions ● GRASP
Fair business environment		
Autonomy of actors/degree of dependency	<ul style="list-style-type: none"> ● Degree of diversification of income sources ● Capacity to take independent business decisions (e.g. what to invest in, what to grow/produce, etc.) ● Access to capital and technology 	
Access to knowledge for all food supply chain actors	<ul style="list-style-type: none"> ● Number of comprehensive sustainability trainings provided to all food supply chain actors (including farmers, farm workers, chefs and cooks, managers, consumers, fishers, etc.) ● Broadband access to rural areas ● Number of education establishments integrating sustainability in 'food' curricula and other relevant curricula ● Number of farmers involved in innovation processes (e.g. member of a research consortium or associated/contributing to a research project) ● % of people working in the food system with a relevant certification from a MOOC ● Efficacy of knowledge exchange between food system actors (formal and informal): number of schemes/participants, number of dedicated platforms or forums, etc. ● Ease of access to required professional information 	

	<ul style="list-style-type: none"> • Availability of farm level advice including number of farm advisers per 10 000 farmers, especially for providing public sector/free advice 	
Consumer empowerment		
<p>Food environments for healthy diets from a sustainable food system</p> <p>(including digital environment, marketing practices, choice diversity, choice environment and access/availability)</p>	<ul style="list-style-type: none"> • Share of schools offering (free) sustainable and healthy school meals [Child guarantee] • Share of pupils exposed to vending machines with unhealthy food in/near schools • Proportion of food for collective restaurants/public catering procured by public bodies in respect of sustainability and health standards • Share of food products on the market compliant with sustainability and health standards • Evolution of share of plant-based proteins • Average distance of consumers to retail outlets offering a healthy choice of foods • Number of national/regional etc. programmes (incl. city design) to improve food environments including digital spaces/apps • Harmonised EU-wide colour-coded FOP labelling scheme • Marketing budgets dedicated to promoting junk foods or foods from unsustainable chains • Exposure of children to advertising of pre-packaged foods high in energy, saturated fats, sugars and/or sodium • Promotional budgets dedicated to supporting sustainable healthy eating • Existence of national legislation on responsible marketing practices (including social media/influencers) • Share of food industry (in turnover) participating in voluntary schemes • Number of court cases/actions taken against misleading advertising on nutrition (sustainability) • Level of public economic support for start-ups/ SMEs (providing a place to sell) • Sustainability projects in canteens (schools, universities, etc.) • Density of fast food outlets per town • % of retailer stores with new layout to make healthy and sustainable products more visible • Rate of implementation of regulatory policies to make the healthy, sustainable choice the easier, more affordable and desirable one (e.g. following the Food-EPI methodology) - including: fiscal and pricing measures, reformulation policies, marketing, promotion and advertising regulations, public procurement policies, labelling policies, trade policies 	<ul style="list-style-type: none"> • The Healthy Food Environment Policy Index (Food-EPI) • BIA-Obesity tool (Business Impact Assessment— Obesity and population-level nutrition) • Tim Lang’s book, Feeding Britain, Pelican 2020, has some data on this and a number of other interesting/less conventional indicators, mostly only for the UK
<p>Knowledge and education about food, diets and the food system</p>	<ul style="list-style-type: none"> • Number of school curricula on food system sustainability and food sustainability and diets, cooking skills • Integration/embeddedness of sustainability in existing school curricula • % of school teachers receiving sustainability and nutrition training • % of schools with school gardening • % of schools, hospitals, senior care homes and other collective catering services serving sustainable meals in the canteen (resulting from requirements in public procurement) • Number of training curricula on (food system) sustainability (post-school trainings) • Share of population with a general common understanding of food and diets • Access to sustainable food recipes (provided by e.g. municipalities/government) 	

CROSSCUTTING

SUSTAINABILITY CRITERIA	INDICATORS	DATA SOURCES
<p>Capacity to innovate</p> <ul style="list-style-type: none"> Investment in R&D related to food systems (private and public) International competitiveness of EU food system R&D 	<ul style="list-style-type: none"> Public and private research spending dedicated to food system sustainability Level of EU R&D funding (Horizon Europe, structural funds) Budget on (food) governance innovation Bibliometric data on food system innovation (Number of patents, publications, citations) Green society: A range of indicators covering net forestation, development of green buildings, recycling, and consumption of meat and dairy Clean innovation: The relative number of green patents, investment in cross-border clean energy, investment in food technology 	<ul style="list-style-type: none"> International comparisons Alston & Pardy ag data worldwide Eurostat data on agriculture FOOD2030 publications MIT Technology Review (2021) The Green Future Index 2021. A ranking of 76 economies on their progress and commitment toward building a low-carbon future. MIT Technology Review Insights, US
<ul style="list-style-type: none"> EU Policy coherence 	<ul style="list-style-type: none"> Indicator allowing to assess the contribution of the regulatory framework sustainability targets agreed at international and EU levels 	
<ul style="list-style-type: none"> Policy coherence for development (import with positive impact & export that does not destroy local food systems), Impacts on local food systems 	<ul style="list-style-type: none"> Number of EU trade agreements with strong sustainability clauses Number of provisions in regional trade agreements (World Bank Deep Trade Agreements DTA) Proportion of impact assessments of trade agreements with third countries including sustainability aspects Share of sustainability certified products imported (MSC, AAC, labels...) Number of countries (EU trading partners) with equivalent standards for food safety and sustainability CO₂ embedded in imports/exports Existence of a policy framework for sustainability (with targets, carbon pricing, sustainability objectives, etc.) 	<ul style="list-style-type: none"> FAO CFS OECD International comparisons Sustainability provisions in trade agreements can be very vague. References to the protection of SPS and other specific standards a useful indicator MIT Technology Review (2021) The Green Future Index 2021. A ranking of 76 economies on their progress and commitment toward building a low-carbon future. MIT Technology Review Insights, US
<ul style="list-style-type: none"> Governance 	<ul style="list-style-type: none"> Number of national/local food strategies including strong sustainability commitments Number and quality of stakeholder engagements in food policy creation (especially with people usually excluded from policy making) Existence of effective multilevel coordination mechanisms Alignment of food policies at all levels of governance and alignment of policies (i.e. food policy and energy policy in a country) 	
<p>Transparency and accountability across the food chain</p>	<ul style="list-style-type: none"> Adoption of traceability systems Stability of labelling schemes (not the number of schemes per se) Share of short-supply chains (direct contacts) Number of transactions within local marketing Frequency of audits Existence of control mechanisms for enforcement Number of cases in courts Number of fraud cases in food procurement Number of food related cases prosecuted (and their financial impact) 	<ul style="list-style-type: none"> iRASFF

Annex 3 Sustainability Criteria not prioritised

The below presents sustainability criteria and indicators, which were mentioned during a brainstorming, but were not prioritised and not further elaborated.

Criteria	Indicator
Environment	
Use of non-biodegradable materials (including packaging and emission of nano/micro plastics)	<ul style="list-style-type: none"> • Amount of particles in nature • Tonnage of plastics used in agriculture, fisheries/aquaculture, packaging, industry, etc. • Micro plastics residues in food and feed • Amount of composite material used
Aesthetic value of landscapes & ecosystems	<ul style="list-style-type: none"> • List of landscapes of exceptional beauty
Contact with wildlife (zoonosis, animal escapees)	<ul style="list-style-type: none"> • Disease burden of zoonotic diseases • Surveillance of vector borne diseases (in and out of EU) • Monitoring of zoonosis in wildlife (in and out of EU) • Data from customs checks (bush meat, etc.)
Fisheries Management / Management of marine resources /Fishing pressure: Respect of maximum sustainable yield for wild capture	<ul style="list-style-type: none"> • Risk Based Assessment using a scoring of RFMOs performances, • Stock-based rating using management rules categories • Existing indicators (CFP) • Risk Based Assessment based on the proportion of overfished stocks by FAO area, and the vulnerability index per species • Unwanted catches and discards: RBA by 'unwanted catch-oriented' pseudo-métier
Sustainable management practices (including use of regenerative practices)	<ul style="list-style-type: none"> • Ha covered using alternative production techniques • Tonnes of food produced using regenerative practices • Degree of conversion to regenerative practices • % of time in a year land is covered • Acreage under precision and organic farming • Acreage in minimum tillage
Environmental impacts in rest of the world - similar criteria (CROSS CUTTING)	<ul style="list-style-type: none"> • Need to agree on indicators at international level
Dependency on fossil fuels / external inputs	<ul style="list-style-type: none"> • Amount of renewable energy in non-food and food production across the food system • Share of fossil fuels in energy use • Fisheries: FUI (fuel use intensity) • Aquaculture: Specific data on total energy used
Impact of circular economy on food safety	<ul style="list-style-type: none"> • Concentration of biological and chemical contaminants in recycled material (circulated material) • Safe use of manure and sewage sludge in agriculture (contaminants) • Waste water re-use (contaminants, AMR, etc.)
Environmental profile of food additives	<ul style="list-style-type: none"> • Biodegradability • Toxicity (EFSA's OpenFoodTox) <p> https://www.efsa.europa.eu/en/data/chemical-hazards-data https://www.efsa.europa.eu/en/supporting/pub/en-1050 https://www.efsa.europa.eu/en/supporting/pub/en-1597 </p>
Resilience	
Economic Resilience [overlaps with economic	<ul style="list-style-type: none"> • Access to insurance, to financing

viability]	<ul style="list-style-type: none"> • Availability of agricultural loans, loans to other actors (manufacturers) • Annual damages/ economic losses/ job losses caused by natural and other disasters (for all sectors of the supply chain)
Ensure adequate food supply through diversity of food sources in the EU (Balance of trade openness with self-sufficiency) and strengthening of local production and regional value chains (for processing)	<ul style="list-style-type: none"> • Food security indicators • <i>Degree of synergies between short and long supply chains</i> • Availability of long and short green lanes for logistics • % of population affected by food insecurity • Stock of a variety of seeds and commodities • Degree of EU self-sufficiency in commodities
Actions to adapt to climate change/mitigate	<ul style="list-style-type: none"> • Monitoring of (climate) changes at local level (adapted culture and fishing effort to ocean production) • Adaptive action • Risk management insurance schemes • Irrigation amelioration, water management (incl. drainage) • Weather warning
Land productivity (+implications for rest of the world) -How do you grow more with less?	<ul style="list-style-type: none"> • Production per unit 'input' used • Land quality changes
International stability [limited EU influence]	<ul style="list-style-type: none"> • N° of disputes/bi-lateral agreements at WTO • Number of trade barriers • Availability of international food stocks • Number of fish stocks sustainably managed (including international fisheries agreements) • Degree of disruption of international exchanges • Assessment of choke points
Energy security	<ul style="list-style-type: none"> • Diversity of supply (external to EU) • Diversity of source/type (internal to EU)
Consumer resilience	<ul style="list-style-type: none"> • Food bank capacity
Wildlife control	<ul style="list-style-type: none"> • Level / balance of wildlife
Economic viability	
Economic viability of small scale producers	<ul style="list-style-type: none"> • Number of small-scale producers: new, disappearing, share of food supply, etc. • Women's income in small scale production • Access to labelling (too expensive, impact on income) • Turnover per employee/ workload per worker • Difference of income per worker of small scale producers in the different sectors along the supply chains • Job maintenance in rural areas • Diversity of income • Access to financial resources, incl. insurance • Stability of regulatory environment • Level of support for the transition • Ease of product market access • Ease of input market access • Access to skilled workers • Land ownership • Long-term land renting contracts • Attractiveness of farming or other small businesses

	<ul style="list-style-type: none"> • Technology investment per turnover
Economic viability of large scale producers	<ul style="list-style-type: none"> • Level of financial support for the transition • Investment capacity • Return on equity, share dividend and added value • Technology investment per turnover
Adoption of transformative business practices (e.g. servitisation?) - <i>How to consume enough?</i>	<ul style="list-style-type: none"> • The subject of the business practice • Value of "internalised externalities" - production of public goods - creation of co-benefits • Shared value in terms of community • Co-creation concept at local level • Number of "new sustainable" products - <i>can we assess sustainability at the level of a product?</i> • Share of products with a sustainability level put on the market • Share of revenue from products with a sustainability label
Administrative burden	<ul style="list-style-type: none"> • Number of procedures and cost to obtain sustainable label • Number of administrative certificates necessary to access support for sustainable practices along the supply chain • Number of hours spent on administrative procedures per year
Age structure	<ul style="list-style-type: none"> • Share of small business owners (e.g. farmers/fishers) <35 • Share of small business owners >50 • Balance of age pyramid
Fair, inclusive, ethical	
Polluter pays and producer responsibility principle (dealing with externalities and responsibility, true cost related)	<ul style="list-style-type: none"> • Existence of regulations aligning actual food prices with externalities of food production
Crosscutting	
Policy coherence - Impact of imported food for EU local food systems? Lack of data	<ul style="list-style-type: none"> • Public procurement (does it link to local law and achieving SDGs) • Clauses using SDGs language (such a food waste)

Annex 4: Relevant EU policy initiatives in the context of the Farm to Fork Strategy

- Step up implementation of Common Fisheries Policy (CFP) (Dec 2022)
- Revision of the marketing standards for seafood products (First semester 2022)
- New Strategic Guidelines on Sustainable EU Aquaculture (18 May 2021) https://ec.europa.eu/oceans-and-fisheries/ocean/blue-economy/aquaculture/aquaculture-guidelines_en
- Support for the algae industry - Commission Communication –Blue Bioeconomy (Second quarter 2022)
- 2023-2027 Common Agricultural Policy Strategic Plan
- Revision of EU marketing standards for agricultural products (Second quarter 2022)
- The New Farm Sustainability Data Network (Second quarter 2022)
- Review of the EU Promotion Programme for agri-food products (First quarter 2022)
- Action Plan for the Development of Organic Production (March 2021) https://ec.europa.eu/info/food-farming-fisheries/farming/organic-farming/organic-action-plan_en#documents
- Review of the EU School Food Scheme (2023)
- Revision of the sustainable use of pesticides directive (Commission adoption planned first quarter 2022)
- Proposal for a revision of the feed additives regulation (Commission adoption planned fourth quarter 2021)
- Revision of the Animal Welfare legislation, including on animal transport and the slaughter of animals and *Consider options for animal welfare labelling to better transmit value through the food chain.* (Fitness Check 2021-2022 and revision of legislation 2023)
- Sustainable corporate governance (Scheduled adoption fourth quarter 2021)
- EU code and monitoring framework for responsible business and marketing practices in the food supply chain (Commission will monitor overall effect F2F, including Code)
- Green claims initiative (Scheduled adoption by Commission 2022)
- Labelling initiatives/food waste reduction (Commission adoption planned fourth quarter 2022)
- Deforestation and forest degradation - New EU Forest Strategy for 2030 https://ec.europa.eu/info/sites/default/files/communication-new-eu-forest-strategy-2030_with-annex_en.pdf
- Green finance and investment - Taxonomy Regulation (adopted 2020) https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en and its delegated acts (adopted April 2021),
- Corporate Sustainability Reporting Directive (adopted April 2021) https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

Annex 5: References

General/Food systems

European Commission SAM (2019). 'A scoping review of major works relevant to scientific advice towards an EU sustainable food system', The Scientific Advice Mechanism Unit of the European Commission, 26p. doi: 10.2777/044579

European Commission, Group of Chief Scientific Advisors (2020), Scientific Opinion No.8 - Towards a Sustainable Food System, doi: 10.2777/282386

European Environment Agency (2017) Food in a green light -A systems approach to sustainable food, doi: 10.2800/884986

FAO and WHO (2018) Sustainable healthy diets – Guiding principles. Rome

FAO (2019) The State of the World's Biodiversity for Food and Agriculture, J. Bélanger & D. Pilling (eds.). FAO Commission on Genetic Resources for Food and Agriculture Assessments. Rome.

IPES-Food (2019) Towards a common food policy for the European Union

Jackson P. et al (2021) Food as a commodity, human right or common good, Nature Food Vol 2, <https://doi.org/10.1038/s43016-021-00245-5>

OECD (2021), Making Better Policies for Food Systems, OECD Publishing, Paris, <https://doi.org/10.1787/ddfba4de-en>

Pe'er, G., et al. (2020). Action needed for the EU Common Agricultural Policy to address sustainability challenges. People and Nature, 00, 1-12. doi: 10.1002/pan3.10080.

SAPEA Science Advice for Policy by European Academies (2020a). A sustainable food system for the European Union. A systematic review of the European policy ecosystem. DOI 10.26356/sustainablefoodreview.

SAPEA, Science Advice for Policy by European Academies (2020b), A sustainable food system for the European Union, DOI 10.26356/sustainablefood

Scientific Advisory Board to the German Federal Ministry of Food and Agriculture 2020, Promoting more sustainable food consumption – Developing an integrated food policy and creating fair food environments; <https://gutachtenwbae.files.wordpress.com/2020/08/wbae-executive-summary.pdf>

Scientific Group for the UN Food Systems Summit (2021) Food systems – definition, concept and application for the UN Food System Summit, and other papers available at <https://sc-fss2021.org/materials/scientific-group-reports-and-briefs/>

Willet W. et al (2019) Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems, Lancet 2019; 393: 447–92, [http://dx.doi.org/10.1016/S0140-6736\(18\)31788-4](http://dx.doi.org/10.1016/S0140-6736(18)31788-4)

Sustainability assessment framework

Selection of consulted documents for the sustainability assessment framework:

Beckman, Jayson, Maros Ivanic, Jeremy L. Jelliffe, Felix G. Baquedano, and Sara G. Scott. November 2020. Economic and Food Security Impacts of Agricultural Input Reduction Under the European Union Green Deal's Farm to Fork and Biodiversity Strategies, EB-30, U.S. Department of Agriculture, Economic Research Service.

Charveriat C., Bodin E. and Planells O. (2021) Targets and indicators for a meaningful implementation of the European Green Deal. Think2030 policy paper by the Institute for European Environmental Policy, Brussels.

Dithmer, J. and Abdulai A. (2017) Does trade openness contribute to food security? A dynamic panel analysis. Food Policy 69 (218–230)

EASAC – European Science Advisory Council. (2017) Academies Opportunities and challenges for research on food and nutrition security and agriculture in Europe. ISBN 978-3-8047-3811-9

Elouhichi, K., Ciaian, P., Espinosa Goded, M., Colen, L., Perni Llorente, A. and Gomez Y Paloma, S., Does the crop diversification measure impact EU farmers` decisions An assessment using an Individual Farm Model for CAP Analysis (IFM-CAP) , LAND USE POLICY, ISSN 0264-8377, 66, 2017, p. 250-264, JRC107040

Environmental Sustainability Index (ESI) . [Environmental Sustainability Index \(ESI\) | SEDAC \(columbia.edu\)](#)

FAO Global Soil Partnership - GSOC MRV Protocol (2020) - A protocol for measurement, monitoring, reporting and verification of soil organic carbon in agricultural landscapes: <http://www.fao.org/3/cb0509en/cb0509en.pdf>

FAO, IFAD, UNICEF, WFP and WHO. 2020. The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets. Rome, FAO. <https://doi.org/10.4060/ca9692en>

FAO. SAFA (2014)- Sustainability Assessment of Food and Agriculture systems. Guidelines. Indicators.Tool. <http://www.fao.org/nr/sustainability/sustainability-assessments-safa>

FAO, RUAF and the MUFPP. The Milan Urban Food Policy Pact Monitoring Framework; <http://www.fao.org/urban-food-agenda/resources/resources-detail/en/c/1416144/>

Hebinck A. et al (2021) A Sustainability Compass for policy navigation to sustainable food systems, Global Food Security Vol 29, <https://doi.org/10.1016/j.gfs.2021.100546>

HLPE, (2015). Water for food security and nutrition. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome 2015

International Food Policy Research Institute. 2021. 2021 Global Food Policy Report: Transforming Food Systems after COVID-19. Washington, DC: International Food Policy Research Institute. <https://doi.org/10.2499/9780896293991>

IPES-FOOD (2016). Thematic Report: 'From Uniformity to Diversity: A paradigm shift from industrial agriculture to diversified agroecological systems'. June 2016. Online resource. Available at: www.ipes-food.org/images/Reports/UniformityToDiversity_FullReport.pdf

Kettunen, M., Bowyer, C., Vaculova, L. and Charveriat, C. (2018) Sustainable Development Goals and the EU: uncovering the nexus between external and internal policies, Think2030 discussion paper, IEEP Brussels, www.think2030.eu.

MIT Technology Review (2021) The Green Future Index 2021. A ranking of 76 economies on their progress and commitment toward building a low-carbon future. MIT Technology Review Insights, US

OECD, FAO & UNCDF, (2016). Adopting a Territorial Approach to Food Security and Nutrition Policy, Paris: OECD Publishing. Online resource. Available at: <http://dx.doi.org/10.1787/9789264257108-en>

OECD (2021) Overcoming evidence gaps on food systems, <https://doi.org/10.1787/44ba7574-en>

Scientific, Technical and Economic Committee for Fisheries (STECF) –Criteria and indicators that could contribute to incorporating sustainability aspects in the marketing standards under the Common Market Organisation (STECF-20-05). EUR 28359 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-36158-9, doi:10.2760/211065, JRC124927.

Sustainable development in the European Union — Monitoring report on progress towards the SDGs in an EU context — 2020 edition - EUROSTAT

UNESCO, UN-Water, 2020: United Nations World Water Development Report 2020:Water and Climate Change, Paris, UNESCO.

United Nations, The United Nations World Water Development Report 2021: Valuing Water. UNESCO, Paris.

Vanham D. et al (2019) Environmental footprint family to address local to planetary sustainability and deliver on the SDGs, Science of the Total Environment 693 (2019) 133642, <https://doi.org/10.1016/j.scitotenv.2019.133642>

Water Poverty Index. Water Scarcity Data 1980-2030 - Water Stress Data 1980-2030

Food environment

level policies influencing food environments and priority actions to create healthy food environments in the EU. Utrecht, Utrecht University, The Netherlands.

Skovgaard, R. E., Flore, R., & Oehmen, J. (2021). The digital foodscape and non-communicable diseases. Analysis of the risk factors of meal delivery applications in Denmark. DTU Skylab Foodlab Report 2021-01. DTU Skylab Foodlab. <https://doi.org/10.11581/dtu:00000101>

Policy coherence

Parson K & Hawkes C (2018) Policy Brief 31 – Connecting food systems for co-benefits: How can food systems combine diet-related health with environmental and economic policy goals?

Parson K & Hawkes C (2019) Brief 5: Policy coherence in food systems. In: Rethinking food policy: A fresh approach to policy and practice.

International trade

Baldock D (2020) Environmental standards for UK agriculture in a new trade policy framework, Institute for European Environmental Policy IEEP

Friel S. et al (2020) The nexus between international trade, food systems, malnutrition and climate change, Nature Food Vol 1, <https://doi.org/10.1038/s43016-019-0014-0>

Rampa F. et al (2020) Briefing note: EU trade policy for sustainable food systems, European Centre for Development Policy Management ecdpm and IPES-Food

Urban food

BCFN, MUFPP (2018) "Food & Cities. The role of cities for achieving the Sustainable Development Goals" www.barillacfn.com.

European Commission, De Cunto et al (2017) Food in cities: study on innovation for a sustainable and healthy production, delivery, and consumption of food in cities, doi 10.2777/752723

European Commission) (2021). Research and Innovation for Accelerating Food System Transformation – Operationalising FOOD 2030 through Living Labs. Publications Office of the European Union. <https://data.europa.eu/doi/10.2777/122836>

FoodSHIFT2030 - Food System Hubs Innovating towards Fast Transition by 2030 (2021) Innovation Brief No 1 Citizen Driven Innovation

Margarini A. et al (2018) Food Losses and Waste in European Cities, Working document

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

On the phone or by email

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696, or
- by electronic mail via: https://europa.eu/european-union/contact_en

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU publications

You can download or order free and priced EU publications from EU Bookshop at: <https://publications.europa.eu/en/publications>. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

The European Commission's science and knowledge service

Joint Research Centre

JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.



EU Science Hub
ec.europa.eu/jrc



@EU_ScienceHub



EU Science Hub - Joint Research Centre



EU Science, Research and Innovation



EU Science Hub



Publications Office
of the European Union

doi:10.2760/381319
ISBN 978-92-76-43727-7