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Commission

Transition pathway for the agri-food industrial ecosystem



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Unit F.3 – Food, Retail, Health

Contact: Giacomo Mattinò – Head of Unit F.3

Email: GROW-FOOD@ec.europa.eu

European Commission

TRANSITION PATHWAY FOR THE AGRI-FOOD INDUSTRIAL ECOSYSTEM

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1. INTRODUCTION

The agri-food ecosystem is one of the fourteen industrial ecosystems identified in the updated EU Industrial Strategy, published in 2021 ⁽¹⁾. In this Strategy, the Commission proposed the co-creation of transition pathways with stakeholders, as a **collaborative tool for the green and digital transition of industrial ecosystems**. The pathways aim to build a **shared vision for 2030** and specific actions for enhanced sustainability and resilience of the industrial ecosystems, in collaboration with all relevant public and private stakeholders.

While the pathways focus on the transition within the EU, it is pivotal to recognise the **broader, global context** of these efforts. The **United Nations Food Systems Summit** held in New York in 2021 ⁽²⁾ recognised the need for food systems transformation as a way forward to achieve the **Sustainable Development Goals** (SDGs), already established by the United Nations (UN) in 2015 ⁽³⁾. Recent challenges, such as the COVID-19 pandemic, have stressed the importance of the transition to sustainable and resilient food systems. The Russian war of aggression against Ukraine has underscored the global risks associated with food insecurity, as well as the vulnerabilities of European countries in their dependence on fossil fuel energy. Furthermore, Europe has been experiencing increasingly erratic weather patterns, including significant droughts and floods. These extreme weather events pose both immediate and long-term risks to the European food system.

In alignment with the UN SDGs and the UN Framework Convention on Climate Change (UNFCCC), the EU launched the **European Green Deal** in 2019, a sustainable and inclusive growth strategy aiming to improve people's health and quality of life within planetary boundaries. The agri-food ecosystem plays an important role in achieving the EU's climate ambitions, while contributing to EU food sovereignty. More resource-efficient and biodiversity-friendly management of the sector can increase its resilience to the impacts of climate change, bringing win-win solutions for food security and productivity.

In the context of the Green Deal, the **Farm to Fork** ⁽⁴⁾ and the **Biodiversity Strategies** ⁽⁵⁾ from 2020 are the two central elements for the transformation of the EU food system. These two strategies were designed to be mutually reinforcing, bringing together primary producers, businesses, researchers and innovators, the public sector and consumers to jointly engage in creating a sustainable and resilient food system. In addition, there are several other EU initiatives that relate to food systems transformation, such as the Bioeconomy Strategy ⁽⁶⁾, SME Strategy ⁽⁷⁾ and Circular Economy Action Plan ⁽⁸⁾. Within this comprehensive framework, the role of digital transformation is pivotal, as also emphasised by the EU's Digital Strategy ⁽⁹⁾. The digital and green transitions go hand in hand, since digital technologies can be key enablers for achieving sustainability goals.

Implementing this wide range of strategies crucially depends on the involvement of stakeholders. The **EU Code of Conduct on Responsible Food Business and Marketing Practices** ⁽¹⁰⁾, part of the Farm to Fork Strategy, has therefore been launched in 2021, to gather sustainability pledges from food operators in the EU. The Code has many relevant businesses and associations as signatories that could promote and implement the actions suggested in this transition pathway.

⁽¹⁾ [Updating the 2020 industrial strategy: towards a stronger single market for Europe's recovery](#)

⁽²⁾ [UN Food Systems Summit \(2021\)](#)

⁽³⁾ [UN Sustainable Development Goals \(2015\)](#)

⁽⁴⁾ [COM \(2020\) 381 final](#)

⁽⁵⁾ [COM \(2020\) 380 final](#)

⁽⁶⁾ [COM \(2018\) 673 final](#)

⁽⁷⁾ [COM \(2020\) 103 final](#)

⁽⁸⁾ [EUR-Lex - 52020DC0098 - EN - EUR-Lex \(europa.eu\)](#)

⁽⁹⁾ [The EU Digital Strategy](#)

⁽¹⁰⁾ [EU Code of Conduct on Responsible Food Business and Marketing Practices](#)

Since this document is aimed at the agri-food industrial ecosystem, **Chapter 2 explains the ecosystem**, including its boundaries and consistency with the food systems approach. This chapter also looks at the prevailing **challenges and barriers** within the ecosystem. Furthermore, connections between the agri-food industrial ecosystem and its interactions with other ecosystems are explored.

Chapter 3 aims to explain the co-creation process of this document. This process started with the **Blueprint** developed by the **EU Industrial Forum** ⁽¹¹⁾, followed by the development of the agri-food transition pathway **Staff Working Document** (SWD) ⁽¹²⁾, and the **public consultation** ⁽¹³⁾ and **workshops**. This chapter also explains how the main principles of the already existing ‘**EU Pathway Towards Sustainable Food Systems Transformation**’ were incorporated ⁽¹⁴⁾. This is a document from May 2023 that was developed as a follow-up to the 2021 UN Food Summit Systems by the Commission Services participating in the Interservice Group on ‘Global transformation of food systems’. It provides an overview of all cross-cutting EU initiatives in relation to the transformation of food systems at EU and international level.

The transition pathway for the agri-food ecosystem covers eight main areas of intervention. **Chapter 4** sets up the main actions under these **building blocks** of the EU Industrial Forum Blueprint:

1. Sustainable competitiveness
2. Public governance
3. Social dimension
4. Research and innovation (R&I) and technological solutions
5. The single market and infrastructure
6. Skills
7. Investments and funding

In addition to those, an eighth block on international trade and cooperation has been added, which was not part of the initial Blueprint approach.

Chapter 5 presents the **conclusion and next steps** of the transition pathway for the agri-food industrial ecosystem. **Chapter 6** gives some guidance on possible **monitoring and co-implementation** and reflects on the existing tools to achieve this goal. Finally, a mapping of EU financing opportunities 2021-2022 and summary of the three workshops held with stakeholders are presented as annexes.

To conclude, it should be mentioned that one of the main objectives of the transition pathway for the agri-food industrial ecosystem is to **build on the existing strategies** relevant for the ecosystem and to **enable their implementation**. This transition pathway does not propose new legislative frameworks or regulations. The suggested actions result from consulting stakeholders and emphasise **possible enablers** for the implementation of the mentioned strategies and initiatives. Finally, while this transition pathway takes a food systems approach, it should also be emphasised that the focus is the **middle part of the food value chain** and its contribution to a fair food system. This refers to the stages that occur between the initial production of raw agricultural products and the final sale to consumers. Issues that specifically refer to retail are dealt with in the **transition pathway for the retail industrial ecosystem**, which has been developed in parallel ⁽¹⁵⁾.

⁽¹¹⁾ The Industrial Forum was set under the EU Industrial Strategy to support the Commission in assessing the different risks and needs of industry for the twin transition.

⁽¹²⁾ [Agri-food transition pathway Staff Working Document \(SWD\)](#)

⁽¹³⁾ [Transition pathway for a more resilient, sustainable and digital agri-food ecosystem stakeholder consultation](#)

⁽¹⁴⁾ [The EU Pathway Towards Sustainable Food Systems Transformation](#) is published on the JRC website as well as on the UNF Food Systems Coordination Hub website under [Dialogues and Pathways](#)

⁽¹⁵⁾ More information at [Retail Ecosystem Transition Pathway cocreation process \(europa.eu\)](#)

2. THE EU AGRI-FOOD INDUSTRIAL ECOSYSTEM

The term agri-food industrial ecosystem refers to **all operators in the food value chain**: farmers, fishers, aquaculture producers, agricultural cooperatives, the food and drink industry, agriculture and food and drinks associations, food retail and wholesale, and food services. It also includes suppliers of inputs and services (seeds, pesticides, fertilisers, machinery, equipment, packaging, repair, transport and distribution, finance, advice and logistics), the research and innovation community (universities, research centres, clusters) and public authorities. When reference to the agri-food ecosystem is made in this document, it is meant to refer to the understanding of the food system in the Industrial Strategy and its annexes. ⁽¹⁶⁾ This also encompasses consumption of food, food loss and waste, as well as other fundamental aspects such as nutrition and health.

The term ‘agri-food industry’ refers usually to both agriculture and farming, fisheries (NACE A) and food processing activities (NACE C10-12) ⁽¹⁷⁾. However, for the purpose of the transition pathway, the focus is on the definition of the **agri-food industrial ecosystem** as defined in the Industrial Strategy ⁽¹⁸⁾ and Annual Single Market Report ⁽¹⁹⁾. This reflection was already made in the SWD ⁽²⁰⁾ and summarised in the report ‘Monitoring the twin transition of industrial ecosystems’ ⁽²¹⁾. As mentioned above, regarding retail it should be noted that there is a dedicated transition pathway ⁽²²⁾.

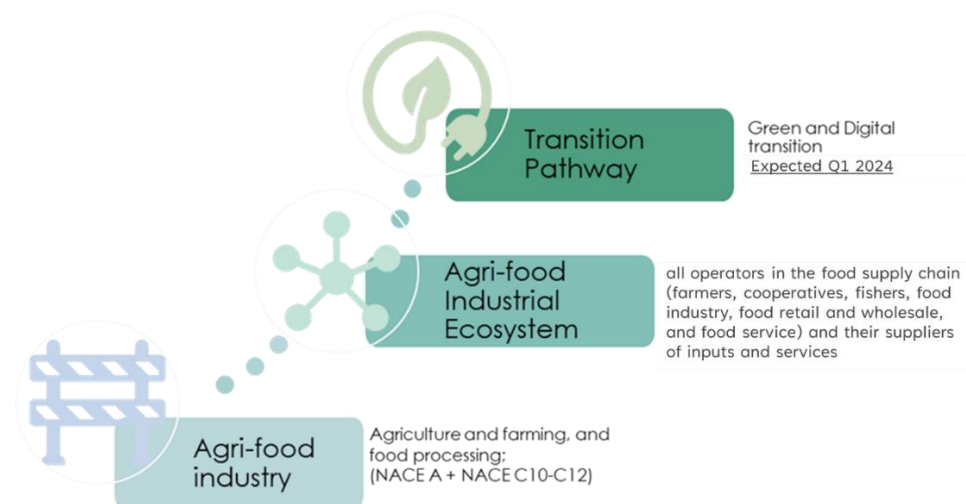


Figure 1: Positioning of the agri-food industrial ecosystem definitions. *Source: DG GROW internal resources from the European Monitor of Industrial Ecosystems, based on the definition of the agri-food ecosystem as described in the Annual Single Market Report (2022).*

According to the 2022 Single Market annual report, the **value added** produced by the activities of the agri-food ecosystem corresponded to €603 billion in 2019 and provided employment for around 16.08 million people ⁽²³⁾. According to sectorial associations, the agricultural industry produced a total value added of €427 billion, 50% from croplands, 40% from livestock, and the lasting 10% from secondary activities not related to food. Agricultural land covers around 48% of European

⁽¹⁶⁾ [European Commission European Industrial Strategy](#)

⁽¹⁷⁾ The term NACE is derived from French: Nomenclature statistique des activités économiques dans la Communauté européenne. NACE codes are used for the classification of economic activities in the EU.

⁽¹⁸⁾ [European Commission European Industrial Strategy](#)

⁽¹⁹⁾ European Commission (2022). [Annual Single Market Report 2022](#)

⁽²⁰⁾ [Agri-food transition pathway Staff Working Document \(SWD\)](#)

⁽²¹⁾ European Commission (2023). [Monitoring the twin transition of industrial ecosystems. Agri-Food. Analytical report](#)

⁽²²⁾ European Commission (2023). [Transition pathway for the retail ecosystem](#)

⁽²³⁾ Annual Single Market Report (2021) 351 final. The report uses data of NACE codes A, C10, C11 and C12 for analytical purposes. The forestry and logging sector is not the focus of this document. Tobacco products will not be analysed in this document [Annual Single Market Report 2022](#)

territory, employing 20.5 million full and part-time jobs ⁽²⁴⁾. The fisheries and aquaculture sector generates an added value of €10.8 billion, employing about 200 000 people jointly ⁽²⁵⁾. For the food and drink industry, the value added would correspond to €229 billion, providing employment to 4.6 million people. Small and Medium-sized Enterprises (SMEs) are the backbone of the agri-food ecosystem: 99% of the 291 000 food and drink enterprises are SMEs. They provide around 39.1% of the turnover and employ about 57.7% of the workforce in food and drink manufacturing ⁽²⁶⁾. Although the agri-food ecosystem has shown resilience during the COVID-19 pandemic, SMEs were mainly impacted, since their turnovers and employment rates were reduced ⁽²⁷⁾.

Despite the difficulties of the sector, there has been a continuous growth of production in the agri-food industrial ecosystem. The only major reductions in production in the years 2009 and 2020 can be associated to the financial crisis and COVID-19 pandemic. Figure 2 shows this trend ⁽²⁸⁾.

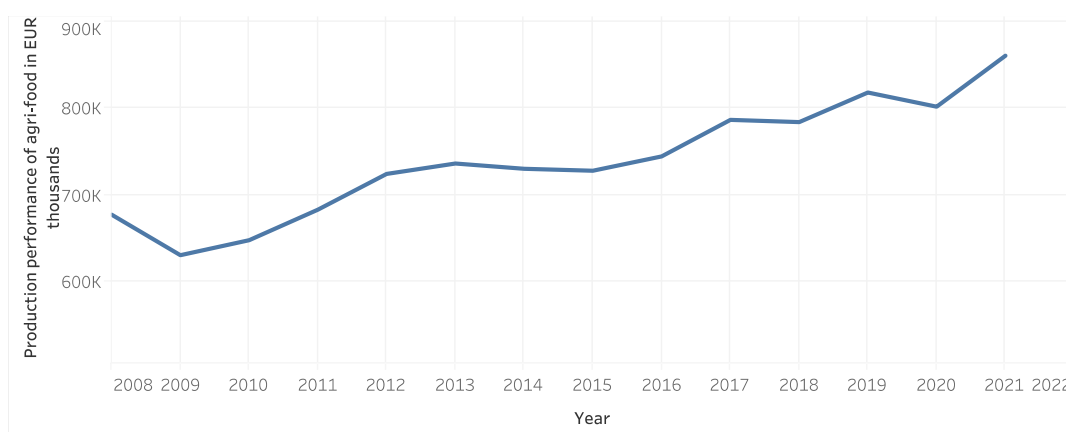


Figure 2: Production performance of agri-food industrial ecosystem in EUR thousands for 2008-2021. *Source: European Monitor of Industrial ecosystems based on Eurostat data.*

It should be noted that the agri-food ecosystem is facing **significant challenges**, affecting both global and EU environmental, social and economic sustainability and resilience. Deforestation and biodiversity loss ⁽²⁹⁾, soil degradation, water pollution and resource scarcity cause adverse environmental effects ⁽³⁰⁾. At global level, food systems still account for around 30% of global greenhouse gas emissions. ⁽³¹⁾ Food and agriculture are responsible for 70% of freshwater withdrawals ⁽³²⁾, 28% solely linked to agriculture ⁽³³⁾. On the consumer end, it has been reported that around 8% of the world's population is undernourished, while another 39% is overweight or obese ⁽³⁴⁾. Food prices are subject to high levels and volatility globally. ⁽³⁵⁾ As far as the EU is concerned, 8,6% of people and more than one in five people at risk of poverty (21.7%) were unable to afford a quality meal every second day. Food assistance is essential for parts of the population in many Member States.

⁽²⁴⁾ Copa-Cogeca (2023). [Data collection](#)

⁽²⁵⁾ European Commission [EU Fisheries and Aquaculture Socio-economics](#)

⁽²⁶⁾ FoodDrinkEurope (2023). [Data and Trends 2023](#)

⁽²⁷⁾ SWD (2022). [Annual Single Market Report 2022](#)

⁽²⁸⁾ European Commission (2023). Monitoring the twin transition of industrial ecosystems. Agri-Food. Analytical report.

⁽²⁹⁾ JRC (2022). [Nature restoration as a solution to minimise biodiversity loss in EU](#)

⁽³⁰⁾ FAO [Energy](#)

⁽³¹⁾ FAO (2022). [Greenhouse gas emissions from agri-food systems. Global, regional and country trends, 2000-2020](#)

⁽³²⁾ European Commission (2021). [Report of the 5th SCAR Foresight Exercise Expert Group - Natural resources and food system: Transition towards a 'safe and just' operating space](#)

⁽³³⁾ European Environmental Agency (2022). [Water abstraction by source and economic sector in Europe](#)

⁽³⁴⁾ FAO (2022).

⁽³⁵⁾ EESC (2022). [Food price crisis: the role of speculation and concrete proposals for action in the aftermath of the Ukraine war](#)

The consequences of **Russia's unprovoked and unjustified military aggression against Ukraine** as of February 2022 have had a huge impact on the agri-food ecosystem. The **COVID-19 pandemic** which started in 2020 had already shown the heavy reliance of food supply on cross-border transportation and the need to further increase resilience to emergencies and crises like pandemics, climate change and geopolitical events ⁽³⁶⁾. Although food business operators were faced with serious challenges (changes in demand, cut-off of key outlets, trade disruption and shortages of workers), the EU agri-food supply chain demonstrated a high degree of resilience ⁽³⁷⁾. The unprecedented increases in energy, gas and commodity prices of 2022 have shed light on the dependency of the EU agri-food system on fossil fuels, with serious consequences for all actors in the agri-food domain. Food producers have had to face higher costs across the value chain as a result of the recent impacts coming from upstream and out of control supply chains (higher prices of fertilisers, animal feed, energy, raw materials, transport and packaging). In the EU, food availability is not at stake, though food affordability for low-income groups is. The risks of global food insecurity have increased ⁽³⁸⁾. In addition, climate change and exceptionally extreme weather conditions in Europe have substantially reduced yields of raw materials ⁽³⁹⁾. To compound the situation, as far as fisheries is concerned, the decrease of catches of some wild stocks of fish poses additional challenges, also heavily affected by global warming as well as loss of marine ecosystems ⁽⁴⁰⁾.

3. THE TRANSITION PATHWAY CO-CREATION PROCESS

The agri-food transition pathway **Staff Working Document** (SWD) ⁽⁴¹⁾, published in July 2023, was meant to set the scene and guide the consultation and co-creation process for the transition pathway. With its publication, a **public consultation** ⁽⁴²⁾ was launched that lasted for two months.

The overall structure of this transition pathway is based on a Blueprint developed by the EU Industrial Forum ⁽⁴³⁾ which shapes all pathways. It covers the following areas:

1. Sustainable competitiveness
2. Regulation and public governance
3. Social dimension
4. R&I, techniques and technological solutions
5. Infrastructure
6. Skills
7. Investments and funding

It is relevant to note that in May 2023 '**The EU Pathway Towards Sustainable Food Systems Transformation**' was published ⁽⁴⁴⁾. This is a follow-up document to the 2021 UN Food Summit Systems, prepared by the Commission Services participating in the Interservice Group on 'Global transformation of food systems'. The reflections of that document have been incorporated into this transition pathway, strengthening particularly the areas of sustainable competitiveness (food

⁽³⁶⁾ European Commission (2020). [Food 2030 pathways for action. Research and innovation policy as a driver for sustainable, healthy and inclusive food systems](#)

⁽³⁷⁾ European Commission (2021). [Preliminary impacts of the COVID-19 pandemic on European agriculture: a sector-based analysis of food systems and market resilience](#)

⁽³⁸⁾ European Council (2023). [Food security and affordability](#); European Commission (2022). [Communication on Safeguarding food security and reinforcing the resilience of food systems](#)

⁽³⁹⁾ JRC (2022). [Summer drought keeps its grip on Europe](#)

⁽⁴⁰⁾ European Parliament (2023). [Workshop on the European Green Deal – Challenges and opportunities for EU fisheries and aquaculture](#)

⁽⁴¹⁾ [Agri-food transition pathway Staff Working Document \(SWD\)](#)

⁽⁴²⁾ [Transition pathway for a more resilient, sustainable and digital agri-food ecosystem stakeholder consultation](#)

⁽⁴³⁾ The Industrial Forum was set under the EU Industrial Strategy to support the Commission in assessing the different risks and needs of industry for the twin transition.

⁽⁴⁴⁾ [The EU Pathway Towards Sustainable Food Systems Transformation](#) is published on the JRC website as well as on the UNF Food Systems Coordination Hub website under [Dialogues and Pathways \(unfoodsystemshub.org\)](#)

security) and public governance. Additionally, a new chapter on international trade and cooperation has been created to incorporate those findings.

During the **Public Consultation**, 80 responses were received from a wide range of stakeholders: EU and national sectoral umbrella business organisations, non-governmental organisations, companies, academic and research institutions, public authorities, trade unions, citizens and many others. The stakeholders represented 19 Member States of the EU, plus two non-EU countries. The consultation focused on the eight blocks of the transition pathway. Participants of the consultation were also asked to participate in subsequent thematic workshops.

Those **three thematic workshops** took place in October and November of 2023. They explored the topics of uptake of digital technologies, investments and funding, and new business models and support to SMEs. The outcomes of the workshops have been incorporated in the respective building blocks (sections of chapter 4) and have been included in more detail in the annexes. The stakeholder workshops were hosted online by the Commission with the help of a subcontracted moderator ⁽⁴⁵⁾ and the support of different Services in addition to DG GROW, such as DG AGRI and DG RTD.

This transition pathway also includes relevant information from the document '**Monitoring the twin transition of industrial ecosystems**' ⁽⁴⁶⁾. This document was developed at the request of the Commission to complement the monitoring of the industrial ecosystems. It includes specific Key Performance Indicators, that were not yet monitored elsewhere. Particularly, the analytical report on agri-food has been used to complement some parts of this document, mainly the analysis of the ecosystem and its monitoring tools.

Finally, it should be highlighted that, since primary producers are already subject to a large range of policies and tools, it has been decided to put a larger focus on the actions of the **actors active in the middle part of the food chain**. Still, the interdependency with other operators in the system, and the fact that the overall performance of the system depends on all actors in it, has been kept in mind in the drafting of this transition pathway.

4. BUILDING BLOCKS OF THE TRANSITION PATHWAY

4.1 Sustainable competitiveness

Sustainable competitiveness can broadly be defined as the ability to generate and sustain inclusive wealth for all, without diminishing the future capability of sustaining or increasing current wealth levels ⁽⁴⁷⁾. It encompasses the economic, environmental and social dimensions of sustainability. When discussing the sustainable competitiveness of the agri-food system, it should be emphasized, as explained above, that **the ecosystem has a broad scope**: it includes all players in the food supply chain, as well as their suppliers of inputs and services. This complexity can make an analysis of its sustainable competitiveness challenging. In response to the consultation question whether the EU agri-food ecosystem performs well in comparison to other non-EU countries, most stakeholders opted for 'rather agree' or 'neutral'. Some of those stakeholders commented that the ecosystem's competitiveness should be considered at the levels of the sectors and/or specific activities that are included in the ecosystem. They rightfully pointed out that the **assessment depends on the specific sectors and regions** that are being considered. The importance of such a targeted

⁽⁴⁵⁾ [Jan Vaessen Facilitation](#)

⁽⁴⁶⁾ European Commission (2023). [Monitoring the twin transition of industrial ecosystems agri-food report](#)

⁽⁴⁷⁾ Hirvonen-Ere, S. (2023). Sustainable Competitiveness. In: Idowu, S., Schmidpeter, R., Capaldi, N., Zu, L., Del Baldo, M., Abreu, R. (eds) Encyclopedia of Sustainable Management. Springer, Cham.

approach should be recognised, although it requires a more detailed analysis than possible in this transition pathway.

Whether a sector-specific or EU, national, regional, or local approach is taken, stakeholders unanimously agreed on the **need for a systems approach**. The food systems approach encompasses the natural, technical, economic and social aspects of several interlinked activity areas. It integrates the One Health approach, by aiming to sustainably balance and optimise the health of people, animals and ecosystems. Food systems thinking relates to the **integration of the complexity of transformation of the food system** through acknowledging the diversity of actors and activities within the system⁽⁴⁸⁾. It improves the understanding of the interdependencies between key parts of food systems at various scales and helps setting the basis for coherent action to reach the desired outcomes. All food system actors, including the EU, its Member States and the private sector, should by default make use of the concept of **food systems** and advocate for its use, if not yet common within their organisations.

Considering the interdependence of all actors along the value-chain, examining the connections among all components of the food value chain through a systemic approach is crucial for enhancing resilience. Resilience requires adaptability, which in turn requires an ability to think systemically about the food system, as phrased by stakeholders in the consultation. **Resilience is the dynamic ability of systems to persist in a functional way**, despite shocks. It is defined as being able to not only withstand and cope with challenges, but also to undergo transitions, in a sustainable, fair, and democratic manner⁽⁴⁹⁾. A system's resilience is **dependent on all three dimensions of sustainability: economic, environmental and social**, and is considered as a **cross-cutting objective** in this document. Even though the focus of this document is on the agri-food ecosystem, it should not be forgotten that there are important interlinkages with other ecosystems (such as retail, tourism and chemicals) that could impact its resilience, as also pointed out by many stakeholders in the consultation.

The **economic dimension of sustainability** of the agri-food ecosystem focuses on generating economic returns for all of its economic operators and maintaining their competitiveness. There is a need for a just distribution of profits, throughout all stages of the supply chain. Business opportunities for a sustainable agri-food value chain could be fostered by leveraging private funds jointly with public funding. For example, new market-based mechanisms can boost sustainable food, which could enhance both a better food price to reflect sustainability as well as a fair reward for farmers and new source of funding for investments⁽⁵⁰⁾. As highlighted in the consultation, European products are recognised for their safety and quality, which is an advantage that everyone in the food chain should benefit from⁽⁵¹⁾. Operators should be able to produce enough of these food products, which should be nutritious and diverse, overall aligned with advice on healthy diets, and for an increasing EU population. Challenges in doing so, as identified during the consultation, include, for instance, the competition for prime agricultural land and lack of generational renewal. It is also important to create further business opportunities for a sustainable agri-food value chain and leverage private funds in synergy with public funding. This underscores the need to unlock further funds through the right incentives in the entire supply chain which can then be used by actors in the food system to finance the transition⁽⁵²⁾. Moreover, other actions could be thought of: working together in producer

⁽⁴⁸⁾ UN (2021). [Food Systems Summit](#)

⁽⁴⁹⁾ JRC [Resilience](#)

⁽⁵⁰⁾ European Commission (2024). Securing our future: Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society.

⁽⁵¹⁾ On production side, food quality is determined by standards and regulations that ensure safety, nutrition and consistency. At the point of consumption, however, the assessment of food quality becomes more subjective, influenced by individual preferences, cultural influences, and perceptions of taste, texture and visual appeal.

⁽⁵²⁾ European Commission (2024). [Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society](#)

organisations, associations of producer organisations or inter-branch organisations could help agricultural producers achieve common interests, for example.

To recognise the need to ensure food security and economic stability at all times, stakeholders have been calling for guaranteed prioritisation of **food as an essential sector of strategic importance** at EU level and across all Member States in a uniform manner. To ensure the competitiveness of the sector, many stakeholders have shared in the consultation that the **availability and price of inputs are crucial**. Disruptions of supply, but also higher and volatile costs, can impact the whole chain, together with challenges in terms of labour availabilities. This has clearly been shown during recent crises, such as the COVID19 pandemic and Russia's invasion of Ukraine. Yet, the agri-food ecosystem has also demonstrated its resilience, since food security has still been ensured, despite the challenging circumstances. Another important issue relevant for stakeholders in the context of economic sustainability, is that of **dependencies**, as also explored in the agri-food transition pathway SWD. For example, for oilseeds meals, the EU only produces 24% of what it needs to feed its livestock sector ⁽⁵³⁾. Such dependencies underscore the need for a multifaceted approach to economic sustainability. Other aspects that are important for the ecosystem's economic sustainability, as emphasised by stakeholders, such as the integrity of the single market and international trade, are discussed in chapters below.

The **environmental dimension of sustainability** implies food systems that are in harmony with the environment. They should help reduce greenhouse gas (GHG) emissions and achieve global climate and biodiversity commitments. Consequently, they would help better respond to the triple environmental crisis that the world is facing (climate change, biodiversity loss and pollution). Food systems should ensure halting and reversing biodiversity loss across natural and managed ecosystems. The EU's transition to a circular and climate neutral economy, together with the ambition to reach zero pollution and protect and enhance biodiversity, has triggered a rethinking of how materials, in particular plastics, are produced, used and disposed of. Food losses and waste must be reduced. A circular bio-based economy should also be established, to ensure the EU gets the most value from all food resources, including by-products. This should be done without compromising food safety, animal or human health.

Although these factors are all crucial, **environmental sustainability should consistently be aligned with economic sustainability**. In the consultation, the risk of increased competitive pressure due to regulatory divergence with non-EU countries was raised. In addition, stakeholders noted increased reporting requirements, which might decrease resources available for priorities such as innovation. However, other stakeholders mentioned that the EU agri-food ecosystem is generally efficient regarding production but has a too high impact on nature and the environment, making clear that there is an urgent need for further ambition in this area.

Primary production is therefore confronted, being located at the start of the food value chain, with an important sustainability mission – to adopt green food production methods and reach ambitious targets, while supporting farmers through the transition ⁽⁵⁴⁾. In order to support the transition to more resilient and sustainable production the operators of the agri-food supply chain may engage in sustainability initiatives with primary producers. They can do so with the aim to ensure that primary producers get a fair economic return for their efforts to enhance sustainability of production beyond what is currently mandatory ⁽⁵⁵⁾. More details on this have been included in the chapter on public governance.

⁽⁵³⁾ [Commission publishes latest forecasts on EU feed protein production and trade - European Commission \(europa.eu\)](#)

⁽⁵⁴⁾ EESC- [NAT/913](#) Promoting autonomous and sustainable food production strategies for the post-2027 CAP.

⁽⁵⁵⁾ [COM \(2023\) IP/23/6370](#)

In that context, the balance (and complementarity) between the need to produce food and the need to reduce the environmental footprint has to be found. The **manufacturing, processing, retailing, packaging and transportation** of food also makes a major contribution to air (including GHG emissions), soil and water pollution and has a profound impact on biodiversity⁽⁵⁶⁾. Environmental sustainability hence requires collaborative action by all actors in the chain. However, while all stages and actors involved are essential to ensure a sustainable transformation, and these inter-dependencies will be clearly recognised, the main focus of this document will remain the middle of the chain. This includes food manufacturing and also food retail, which plays a key role in creating a positive food environment through nudging consumers towards healthier and more sustainable choices. Their product development, marketing and pricing policies all affect the food environment. All elements which are needed for the shift towards environmental sustainability, and which were highlighted in the consultation by stakeholders, such as R&I, investments, and funding, are discussed in the following chapters.

The **social dimension of sustainability** encompasses human health and all its related aspects, such as combatting antimicrobial resistance. It includes the fight against overweight, obesity and diet-related diseases, for example by encouraging healthier diets, that could be enabled by making healthier and more sustainable food the easy choice for consumers⁽⁵⁷⁾. The social dimension also covers food availability and affordability, which is a pressing issue because of the cost-of-living crisis, caused by high inflation, supply chain disruptions and Russia's invasion of Ukraine. Furthermore, this dimension aims at improving occupational health and safety, employment and social rights for workers, as well as respect for human rights more widely in the food chain. In addition, it takes the perspective of promoting fair trade and enhancing animal welfare. However, it should be noted that animal welfare also contributes to the other dimensions of sustainability. For example, better animal welfare means healthier animals, with a better feed conversion and a lower carbon footprint. Healthier animals require less use of antimicrobials and therefore less incidence of antimicrobial resistance. In addition, the social dimension includes socio-cultural elements specific to each country and culture, and food security in a global context. This social dimension is further examined in a dedicated chapter below.

Like economic sustainability, social sustainability is also linked to environmental sustainability, since consumer choices can have an important impact on the sustainability of food systems. Sustainable consumer habits can depend on culture, social aspects and upbringing, but also the food environment, because of elements such as affordability, availability and accessibility of food. Purchasing habits can also be affected by advertising and promotion campaigns as well as consumer information, including at the point of sale. In the consultation, changing consumer preferences were highlighted both as challenge and opportunity, since consumer demand can shape the rest of the food system. An example is that more consumers are exploring plant-based alternatives⁽⁵⁸⁾. Such protein diversification could enhance resilience, as noted in the consultation.

It can be concluded from the consultation that, in order to work on all three dimensions of sustainability, reinforced **collaboration within the food system actors** is one of the most important solutions. Many stakeholders have emphasised, both in the consultation and during the workshops, the importance of collaboration, especially to support SMEs. To support collaboration, the **Transition Pathway Platform (TPP)** for the agri-food industrial ecosystem will offer the opportunity for all stakeholders to be informed about existing and upcoming **projects and networks**. Via the membership, workspace and forum functionalities, it will also facilitate **stakeholder interaction**. Furthermore, in the consultation, feedback was shared on the need to

⁽⁵⁶⁾ COM (2020). [A Farm to Fork Strategy](#)

⁽⁵⁷⁾ European Commission (2021). [EU burden from non-communicable diseases and key risk factors](#)

⁽⁵⁸⁾ Analysis of data across 13 European countries showed sales of plant-based foods grew by 21% between 2020 and 2022: [Market insights on European plant-based sales 2020-2022 - GFI Europe](#)

provide information and training to all actors in the chain based on scientific evidence for the food transition. On the TPP, **news and articles** about the agri-food ecosystem will therefore be shared, equipping stakeholders with the latest insights and practices. Finally, the TPP will provide **knowledge and learning resources** and information about relevant events and trainings, to enhance the expertise and capabilities of stakeholders.

Chapter 4.1 is relevant to all aspirational objectives of the EU Code of Conduct on Responsible Food Business and Marketing Practices

Action	Actors	Timeframe
1. Make use of and advocate for the use of the concept of food systems to enable a systems approach	EU / EU MS / Private sector	Short / Medium / Long
2. Link the Transition Pathway Platform (TPP) to existing initiatives and inform about upcoming projects and networks to solidify collaborative efforts across the agri-food chain	EU / EU MS / Private sector	Short / Medium / Long
3. Facilitate stakeholder interaction via the membership, workspace and forum functionalities of the TPP to stimulate networking	EU / EU MS / Private sector	Short / Medium
4. Draft and share news and articles on the TPP to encourage stakeholder awareness of relevant developments	EU / EU MS / Private sector	Short / Medium / Long
5. Provide knowledge and learning resources mapping via the TPP to allow all stakeholders to cultivate their expertise and growth	EU / EU MS / Private sector	Short / Medium

4.2 Public governance

The main EU strategy for the agri-food ecosystem remains the **Farm to Fork Strategy**, published in May 2020. It is at the heart of the European Green Deal and aims to make food systems fair, healthy, and environmentally friendly through 27 legislative and non-legislative actions at all stages of the food value chain ⁽⁵⁹⁾. The actions are very diverse, a few examples include ones focused on reduction of food loss and waste, corporate governance, marketing standards and animal welfare. Other relevant strategies for the agri-food ecosystem focused on sustainability include the new **Circular Economy Action Plan** (for example because of the proposal for a Packaging and Packaging Waste Regulation) and the **EU Biodiversity Strategy** (for example because of the Deforestation Regulation), both also adopted in May 2020.

As recognised in these strategies, sustainability could be accelerated thanks to increased digitalisation. The EU's digital strategy aims to make the digital transition work for people and businesses, while helping to achieve its target of a climate-neutral Europe by 2050 ⁽⁶⁰⁾. The **Digital Decade** policy programme guides Europe's digital transformation with concrete targets and

⁽⁵⁹⁾ COM (2020) 381 final. [A Farm to Fork Strategy](#)

⁽⁶⁰⁾ European Commission. [A Europe fit for the digital age](#)

objectives for 2030, while the **Coordinated Plan on AI** specifically focuses on possibilities offered by AI. Relevant initiatives in the digital field include the setting up of the Common European Data Spaces, the adoption of the Data Governance Act and of the AI Act.

Stakeholders indicated during the consultation that business operators need to be able to base their investments and development strategies on clear indications of the direction established for food systems. Since it is crucial for stakeholders to stay up to date of the latest legislative developments, the agri-food Transition Pathway Platform will, in addition to all of the features highlighted in the previous chapter, also provide information on the latest developments regarding **policy and regulation**. The current emphasis for the actions of this transition pathway is on boosting implementation through various enablers, such as R&I, skills and investments and funding, which will be explored in detail in subsequent chapters.

To make a more sustainable, digital and resilient agri-food ecosystem a reality, the Commission has consistently underlined the need for collaboration and commitment among various stakeholders in the food supply chain. Consequently, one of the first deliverables of the Farm to Fork Strategy was the **EU Code of Conduct on Responsible Food Business and Marketing Practices** ⁽⁶¹⁾, launched in July 2021. Its objective is to stimulate concrete voluntary initiatives by all actors of the middle food supply chain, such as food processors, food service operators and retailers, towards the sustainability of the food value chain, and to promote healthy and sustainable consumption patterns. The Code currently has more than **140 signatories** that have made over **500 commitments** in their pledges. In their annual reports, signatories have shown that concrete results are being achieved for these commitments, such as reductions in food waste and in the use of virgin plastics. Some signatories have even demonstrated increased ambition by updating their pledges with new commitments. However, as already highlighted in the previous chapter, a key issue mentioned by stakeholders in the consultation was the need for more collaboration. It was emphasised that governance should ensure that different stakeholders, such as farmers, cooperatives, industry and academia, work together to reach common goals. Together with the signatories of the Code, the Commission is therefore active in maintaining an exchange between the community of signatories, and also in attracting more SMEs, to further enhance the impact of the Code. The recently launched **Agri-food Code of Conduct tool** has been developed to help stakeholders discover the objectives of the Code, find relevant best practices, carry out a self-evaluation and help SMEs to sign up to the Code with an automatically generated pledge ⁽⁶²⁾. Furthermore, it should be pointed out that multiple Directorates-General (DGs) of the Commission are involved in the work on the Code, which aligns with calls of stakeholders in the consultation for good **alignment between DGs**.

If the EU food system would become more sustainable and digital, it could also become more **resilient**. It should produce sufficient food to feed people at all times. The food should be varied, safe, healthy, affordable and sustainable. To prepare for crises threatening such food security, the Commission set up a **European food security crisis preparedness and response Mechanism (EFSCM)** in coordination with Member States and stakeholders. It will be crucial to maintain an open dialogue within this forum with all stakeholders, including those in the middle of the chain, to maintain resilience and efficiency in the food supply chain. Different DGs are involved in the EFSCM, to ensure coordination within the institutions. In her 2023 State of the Union address, President Von der Leyen announced another opportunity for exchanges: a **Strategic Dialogue** on the Future of Agriculture in the EU. The Dialogue was launched with a first meeting on 25 January 2024 attended by representatives of all segments of the food value chain, including input producers, different types of farmers, processors and manufacturers and traders. Moreover, retailers, distributors, financial

⁽⁶¹⁾ [EU Code of Conduct for Responsible Food Business and Marketing Practices](#)

⁽⁶²⁾ [Agri-food Code of Conduct tool | European Cluster Collaboration Platform](#)

institutions, consumers, civil society, as well as national-level organisations are part of the discussions.

In addition to such non-legislative initiatives that focus on exchanges on how to improve the food supply chain, legislative initiatives such as the **Unfair Trading Practices (UTP) Directive** also contribute to this aim ⁽⁶³⁾. Stakeholders have emphasised in the consultation the importance of this piece of legislation for primary producers, SMEs, but also other actors within the chain. The Commission is currently assessing, in the context of its evaluation of the Directive, the effectiveness of measures taken by Member States in the context of the Directive. The Directive had to be transposed into national laws by May 2021 and applied by November 2021, or twelve months after transposition in the case of existing supply agreements. By the end of 2025, the Commission will present an evaluation of the Directive that will not only assess the effectiveness of these measures, but also the cooperation among the competent enforcement authorities.

Another important legislative initiative was the introduction of a new exclusion from competition rules in 2021 for agricultural products: **Article 210a in the CMO Regulation**. The recently adopted Sustainability Guidelines clarify this exclusion from competition rules, which is aimed at fostering sustainability-enhancing agreements between primary agricultural producers and other supply chain operators. This provision allows for fair remuneration of primary agricultural producers, achieved through mechanisms such as price premiums, establishing higher overall prices, or limiting the quantity of products available on the market. The focus is on recognising and rewarding primary agricultural producers' efforts in enhancing sustainability. The exclusion encompasses objectives related to the environment, reduction of pesticides and antibiotics, as well as advancements in animal health and welfare. To comply with this exclusion, the sustainability initiatives would need to go beyond the rules mandated by the EU or national law. They would consequently provide a framework to incentivise and acknowledge primary agricultural producers' contributions to sustainable agricultural products.

Since the focus of this document remains the middle of the chain, it is key to address initiatives for these actors. In the consultation and during the workshops, specifically the one on SMEs, stakeholders called for various actions to support businesses in their resilience and sustainability journey. The **European Cluster Collaboration Platform (ECCP)** ⁽⁶⁴⁾ is an important initiative to assist businesses, since it serves as an online resource for cluster participants. Its goal is to enhance the competitive edge and sustainability of European industrial ecosystems, especially by supporting SMEs. It aims to improve their performance in areas like productivity, innovation, internationalization, and efficient use of resources. It includes the **Green Transition Support** platform, for example, which is a knowledge hub for energy and resource efficiency, and emission reduction in European businesses. This part of the ECCP offers good practice examples to inspire, opportunities for businesses to submit and share their solutions and achievements, and practical tools to guide businesses through their green transition ⁽⁶⁵⁾.

Focusing specifically on the needs of SMEs, the **Enterprise Europe Network (EEN)** is the world's largest support network for SMEs with international ambitions. Its Sector Group Agri-Food provides support to agri-food SMEs, including on sustainability. The EEN also has special **sustainability advisers**, as introduced by the EU **SME Strategy**, which can help SMEs identify the best ways to benefit from more sustainable business models. Based on a thorough assessment of the needs and challenges of the SME, they provide tailored advice and tap into EEN's vast potential to find innovation partners, new green technologies and market opportunities for sustainable solutions ⁽⁶⁶⁾.

⁽⁶³⁾ [Unfair Trading Practices Directive](#)

⁽⁶⁴⁾ [European Cluster Collaboration Platform \(ECCP\)](#)

⁽⁶⁵⁾ [Green Transition Support | European Cluster Collaboration Platform](#)

⁽⁶⁶⁾ [Sustainability | Enterprise Europe Network \(europa.eu\)](#)

Finally, it should be emphasized that while numerous initiatives are envisaged and coordinated at the EU policy level, the implementation of these plans mainly unfolds at **local level**. Input from the consultation showed that policy coordination among different governance levels is seen as essential to ensure a supportive policy environment. It is vital to clearly recognise and harness the **role of regions and cities** in ensuring successful implementation, mainly for SMEs. They are better equipped to design strategic approaches for SME and entrepreneurship policy because of their understanding of the needs of SMEs. They are more in touch with the enterprises, as a stakeholder phrased it in their contribution to the consultation. The understanding of local contexts and direct engagement with community stakeholders are invaluable assets at these levels of governance. Interinstitutional cooperation, exemplified by collaborations with entities like the **Committee of the Regions**, along with targeted initiatives such as the **Milan Urban Food Policy Pact**, underscore how public governance can be a powerful catalyst in driving and supporting sustainable food systems at a level closer to the everyday lives of citizens and operations of businesses. The EESC has also recommended, for instance, to establish a ‘European Food Policy Council’. This would be a new governance model to accelerate the alignment of policies at EU, national and local levels, and to increase the quality and legitimacy of EU food policy ⁽⁶⁷⁾.

Since the agri-food ecosystem also includes **fisheries and aquaculture**, it should be noted that there are multiple public governance actions taking place at different levels for these sectors. The Commission has published a Communication on the energy transition of EU fisheries and aquaculture in February 2022, for example. The aim of this Communication is to support the sector towards becoming more sustainable and resilient by switching to the use of more renewable and low carbon energy sources ⁽⁶⁸⁾.

Finally, it is crucial to highlight that **there are numerous other EU initiatives that could impact the operations of specific actors within the food system** (e.g. the Chemicals Strategy for Sustainability, New Genomic Techniques Regulation, EU Platform on Food Losses and Food Waste). However, this chapter has focused on the initiatives relevant for the main issues raised by stakeholders in the public consultation. For a more detailed overview of EU strategies and initiatives, please see the agri-food transition pathway SWD.

Chapter 4.2 is particularly relevant to aspirational objectives 3, 4, 5 and 6 of the EU Code of Conduct on Responsible Food Business and Marketing Practices

Action	Actors	Timeframe
6. Support the implementation of deliverables of relevant EU strategies by providing information on policy and regulation on the TPP	EU / EU MS	Short / Medium / Long
7. Enhance the impact of the EU Code of Conduct on Responsible Food Business and Marketing Practices to foster greater collaboration among stakeholders	EU / Private sector	Short / Medium / Long
8. Maintain an ongoing dialogue with all agri-food stakeholders in the context of the	EU / EU MS / Private sector	Short

⁽⁶⁷⁾ EESC- [NAT/892- Towards a European Food Policy Council as a new governance model in the future EU Framework on Sustainable Food Systems](#)

⁽⁶⁸⁾ COM (2022). [Communication on the Energy Transition of the EU Fisheries and Aquaculture sector](#)

EFSCM to collectively enhance readiness and efficiently manage potential crises		
9. Apply Article 210a CMO Regulation and the Sustainability Guidelines to facilitate and establish sustainability agreements	EU / EU MS / Private sector	Short / Medium / Long
10. Amplify support through agri-food business support organisations , especially the ECCP and EEN, by boosting the collaboration between organisations	EU / EU MS	Short / Medium
11. Increase awareness of the Green Transition Support of the ECCP and sustainability advisers of the EEN to enhance the engagement and participation of SMEs in sustainable practices	EU / EU MS	Short / Medium
12. Leverage the power of regions and cities to effectively implement policies at local level	EU / EU MS	Short / Medium / Long

4.3 Social dimension

The long-term resilience of the food system calls for fair and constructive commercial relationships, enabling fair distribution of margins for all, especially primary producers and smaller actors. This approach is vital for promoting social equity and economic viability. Additionally, **fair remuneration** is essential for attracting and retaining talent within the sector.

When it comes to the social dimension of the agri-food ecosystem, it should be emphasised that the **workforce is integral** for its good functioning. The sector is highly dependent on the availability and quality of the workforce. **Ensuring quality jobs and good working conditions**, in addition to fair wages, remains the key priority to achieve a successful transition. The agri-food workforce is often insufficient and socially vulnerable because of the working conditions: low salaries, difficult working conditions, a migrant workforce and short term or seasonal contracts.

According to the responses to the public consultation, stakeholders see the **improvement of working conditions** as the first priority of the social dimension. Several key suggestions have emerged, focused on policies to enhance employment rights protection. These include legislative measures and enforcement mechanisms to ensure fair wages and job security, as well as safe and good working conditions. Additionally, there is an emphasis on improving work-life balance and providing support for families. The suggestions also propose incentives in contracts for young workers, and the improvement of social security entitlements, including unemployment benefits. Further recommendations include better access to healthcare services, enhanced support for migrant workers and workers with disabilities, and improved childcare support for working parents.

Linked to the working conditions, the need to increase awareness of the ecosystem's workplace realities and need to **improve the image of the agri-food sector** was highlighted. The aim would be, among other goals, to attract and retain younger generations and ensure working conditions which allow older generations to remain at work. The need to realise generational renewal is

predominant in the agricultural and fisheries sector, where there is a continued loss of workforce ⁽⁶⁹⁾. Nevertheless, the lack of qualified workforce is also predominant in the food industry, food services and specialised jobs. **Improving vocational education and training (VET) programmes** could enhance the attractiveness of the agri-food ecosystem for young people and provide the workforce with better opportunities for upskilling and reskilling. Further input regarding this topic can be found in chapter 4.6 of this document.

Stakeholders also argued that maintaining **EU social standards in reference to non-EU countries** should be prioritised in trade relations. Additionally, the importance of compliance of foreign countries with all relevant international conventions on labour, social rights and the environment was underlined.

Moreover, the fundamental role of the **social dialogue** for the policy making process was highlighted at EU and, most importantly, at national level. The social partner organisations are indeed best suited to effectively contribute to reformulating or implementing policies that can support the sector, including regarding working conditions and social rights. A noteworthy initiative in that context at EU level is the establishment of the 44 **European Sector Social Dialogue Committees (ESSDC)**. Their Work Programmes address sustainable employment challenges, including qualifications and training needs of the sectors concerned. For example, the EU food and drink sector social partners have developed ‘Good practices and tools from the food and drink industry in Europe’ as a toolbox for their members ⁽⁷⁰⁾. Furthermore, the EU agricultural sector social partners have developed the Online interactive Risk Assessment (OiRA) tool to help companies assess and manage their occupational risks. The Commission committed to strengthen social dialogue through its Social Dialogue Initiative adopted in 2023 and the Val Duchesse follow up process ⁽⁷¹⁾. While this primarily impacts national levels through various mechanisms, the Treaty based social dialogue at EU level also remains paramount.

The role of **Corporate Social Responsibility (CSR)** in businesses is another key enabler for the social dimension, particularly when such programmes are included in business operations. Examples of CSR activities include those aimed at achieving gender balance, a child-labour free chain and fair wages. Corporations can use CSR programmes to integrate a food systems approach in their operations and help smaller partners achieve common social and environmental goals. In addition, disclosing CSR activities could lead to higher employee motivation, higher commitment to business partners, and an improved image of the sector. Even though smaller businesses may not have dedicated CSR departments, they still engage in social responsibility activities. Those activities are also crucial for leveraging efforts towards a socially just transition. Ultimately, large private operators should streamline the role of CSR within their business operations. This would help other companies, mainly the smaller ones, better understand what the best practices are.

Another important element that is linked to the social dimension is that of **food environments**. Business operators need to promote food environments that make the healthy and sustainable choice the easy choice, which is what the first aspirational objective of the EU Code of Conduct on Responsible Food Business and Marketing Practices is about: ‘Healthy, balanced and sustainable diets for all European consumers’. It aims at reversing malnutrition and diet-related noncommunicable diseases (NCDs) in the EU, while reducing the environmental footprint of food consumption by 2030. Governments also have a major role to play, for example through setting concrete goals for the private sector to achieve, and through monitoring food consumption, changes in the food offer and

⁽⁶⁹⁾ OECD (2023). [Labour and skills shortages in the agro-food sector](#)

⁽⁷⁰⁾ European Federation of Food, Agriculture and Tourism Trade Unions (2019). [Toolbox: Good practices and tools from the food and drink industry in Europe](#)

⁽⁷¹⁾ COM (2024). [Val Duchesse declaration](#)

progress made by the private sector. Moreover, they can adopt appropriate regulations, make the right public procurement choices and establish taxation policies.

Many other activities were proposed by stakeholders in the consultation, such as supporting communities in rural areas to improve living conditions beyond work, and focusing policies on the younger generation to make the sector more attractive. Furthermore, improving business profitability is seen as crucial, and providing finance and access to machinery and technology. It is important to mention the presence and growing role of social economy business models. Those leverage for example collective bargaining power (e.g. through producers' cooperatives), joint investments (e.g. through energy communities) and pooling of various types resources by producers in a cooperative non-profit legal form. Moreover, stakeholders added there should be an exchange of expertise and best practices between national regional initiatives and different model regions, according to the stakeholders. Developing training centres, collaborative networks and implementing gender equality initiatives were argued to be other key aspects. Additionally, boosting social innovation and promoting research and innovation oriented towards social issues were recommended. Improving conditions of access to foreign skilled workers, reducing administrative complexity, and improving the legal framework for temporary agency workers and labour intermediates were also suggested. Lastly, stakeholders argued that it is critical to examine how to account for the true cost at the social level for food production.

There are already existing initiatives and enablers of a just transition in place that target these issues. The Council Recommendation on ensuring a fair transition towards climate neutrality, adopted in June 2022, pays attention to the needs of the people, households and regions most affected by the transition, in particular those already in vulnerable situations. The Recommendation provides concrete guidance on the measures needed in different areas, such as the active support to quality employment, education, training and skills, tax-benefit and social protection systems and access to essential services ⁽⁷²⁾. In April 2023, the Council stressed the importance of the circular and sustainable bioeconomy to modernise food systems and contribute to rural development ⁽⁷³⁾. Some policy tools focus on social needs related to food, nutrition, and access to food. The 'European Child Guarantee' is a good example, which provides guidance to Member States to guarantee effective access to sufficient and healthy nutrition for children in need ⁽⁷⁴⁾. Business actors in the agri-food ecosystem, including food industry and retail, have a responsibility when it comes to the social dimension in their operations. This is particularly highlighted in aspirational objective 5 of the EU Code of Conduct on Responsible Food Business and Marketing Practices, which focuses on sustained, inclusive economic growth, employment and decent work for all. Yet, signatories of the Code also have a responsibility when it comes to the other social aspirational objectives. They could envisage submitting more commitments in relation to healthy and sustainable diets, for example, in line with aspirational objective 1 of the Code.

The role of rural areas ⁽⁷⁵⁾ and cities ⁽⁷⁶⁾ in the food sector should also be highlighted. Strengthening the sustainability of rural areas can increase the ecosystem's resilience, but they often face social challenges, such as weak social services ⁽⁷⁷⁾. Making rural areas more socially resilient is therefore part of a just transition. Cities are also key when it comes to social dimension of the ecosystem, as demonstrated by initiatives such as the Milan Urban Food Policy Pact, signed by 270 cities ⁽⁷⁸⁾.

⁽⁷²⁾ Council (2022). [Recommendation on ensuring a fair transition towards climate neutrality](#)

⁽⁷³⁾ Council conclusions 8194/23.

⁽⁷⁴⁾ European Commission (2021). [School scheme](#)

⁽⁷⁵⁾ European Commission. [Rural Vision](#)

⁽⁷⁶⁾ World Economic Forum (2020). [Sustainable development in cities](#)

⁽⁷⁷⁾ FAO (2015). [Technical Workshop. The Implications of Social Farming for Rural Poverty Reduction. final report](#)

⁽⁷⁸⁾ [Milan Urban Food Policy Pact](#)

Although various actions should be taken to achieve a just transition in the agri-food ecosystem, **certain key enablers can be directly implemented through activities by the EU, Member States and private actors**. Prioritising the strengthening of robust legislation, enforcement mechanisms, and infrastructures is essential for all stakeholders involved to ensure better working conditions. Although there are many initiatives already in place, there is a need for a more effective exchange and implementation of best practices across these areas. The Transition Pathway Platform (TTP) can serve as a valuable tool for disseminating information about initiatives, although it is worth noting that sharing information might not be sufficient, given the complexity of the issues at stake. An active role of all actors is therefore needed in the different areas mentioned above.

Chapter 4.3 is particularly relevant to aspirational objectives 1 and 5 of the EU Code of Conduct on Responsible Food Business and Marketing Practices

Action	Actors	Timeframe
13. Share best practices that can improve working conditions, for example related to legislation and enforcement mechanisms	EU MS	Medium
14. Make maximum use of social partner consultations and involvement through Social Dialogue when it comes to legal and policy initiatives, both at European and national level	EU / EU MS / Private sector	Short / Medium
15. Use Corporate Social Responsibility (CSR) programmes to integrate a food systems approach and help smaller partners increase awareness and give visibility to best practices and existing actions	Private sector	Short / Medium
16. Encourage healthier and more sustainable diets , in line with Food Based Dietary Guidelines and the first aspirational objective of the EU Code of Conduct on Responsible Food Business and Marketing Practices	Private sector	Short / Medium / Long

4.4 Research & innovation and technological solutions

Research and innovation (R&I) is essential in steering the green and digital transition of the EU's agri-food ecosystem⁽⁷⁹⁾ and the global transition to reach the UN SDGs. It is vital to understand that innovation goes beyond just technological advancements, as it also includes innovative operational, organisational, social, institutional and governance processes. Still, this chapter mainly focuses on technology uptake.

Despite growing R&I investments in agri-food, **the EU food and drink industry invests less in R&I than several competitors across the globe**⁽⁸⁰⁾. The EU R&I investment Scoreboard classified

⁽⁷⁹⁾ Although this section mainly focuses on R&I at EU level, it should be noted that international cooperation in research and innovation is also a strategic priority for the EU.

⁽⁸⁰⁾ FoodDrinkEurope (2023). [Data & Trends of the European Food and Drink Industry 2023](#)

the food and drink industry as having medium-low R&I intensity. Stakeholders have also highlighted issues such as dispersed research, lower investments and a need for an improved innovation culture for sustainable progress. Nonetheless, the EU food industry, including innovative SMEs, has launched many new products and processes, as for example demonstrated by EIT Food's Rising Food Stars network ⁽⁸¹⁾. Hence, the EU agri-food ecosystem has promising prospects, and its full potential must be unleashed with the help of all the available enablers ⁽⁸²⁾. When it comes to food retail, it should be pointed out that there is 'non-applicability' of R&I funding to the sector. This is the case because it engages mostly in process innovation that enables bringing innovative solutions to the market.

According to the input provided by stakeholders in the public consultation and the workshops (see Annex 2), there is a **set of prioritised technologies ready for uptake by the market**, including:

- Artificial intelligence (AI)
- Automation & robotics
- Biotechnology & bio-solutions
- Chemical recycling
- Digital monitoring systems
- Internet of Things (IoT) & big data
- New genomic techniques
- Plant protein technology
- Precision/smart agriculture
- Renewable energy & decarbonisation ⁽⁸³⁾
- Traceability
- Waste reduction & circular valorisation

These findings align well with other R&I mappings of the sector such as 'A strategic approach to EU agricultural research & innovation' ⁽⁸⁴⁾, the 2023 AgriResearch Conference ⁽⁸⁵⁾, the 'Food 2030 Research and Innovation – Pathways for action 2.0' report ⁽⁸⁶⁾, the Fit4Food2030 inventory ⁽⁸⁷⁾ or the Strategic Research and Innovation Agenda of the European Technology Platform (ETP) 'Food for Life' ⁽⁸⁸⁾.

In addition, the workshop brought **input on possible enablers**, such as:

- A trusted data platform supporting sharing and development of AI
- Harmonisation and interoperability of R&I incentives
- Further targeted incentives for investments
- Circular business model solutions
- Better advisory service support ⁽⁸⁹⁾
- High quality design
- Knowledge transfer of technology to operators across the sector
- Innovation to enhance working methods for the workforce

Starting with the broad concept of digitalisation, stakeholders highlighted the critical role of **data-driven tools and decision-making** in achieving sustainability objectives. Technologies such as remote sensing, advanced weather forecasting and digital monitoring systems, along with further

⁽⁸¹⁾ EIT Food Entrepreneurs. [Scale](#)

⁽⁸²⁾ OECD (2023). [Policies for the Future of Farming and Food in the European Union](#)

⁽⁸³⁾ Some examples of renewable energy and decarbonisation are industrial heat pumps.

⁽⁸⁴⁾ European Commission (2016). [A strategic approach to EU agricultural research & innovation](#)

⁽⁸⁵⁾ European Commission (2023). [2023 AgriResearch Conference](#)

⁽⁸⁶⁾ [Food 2023 Research and Innovation – Pathways for action 2.0](#)

⁽⁸⁷⁾ Fit4food2030 project (2021). [Inventory of R&I breakthroughs related to food systems](#)

⁽⁸⁸⁾ ETP Food for Life (2021). [Strategic Research and Innovation Agenda](#)

⁽⁸⁹⁾ One example is the [Advisory Networks](#) under the EU CAP Network

automation, will be key for optimising food production. However, the possibilities offered by Internet of Things and big data are yet to be fully realised. In this new data-driven environment, the **pivotal role of AI** is emphasised for analyses and decision-making in production. AI could enhance, amongst others:

- **Farming:** Monitor crops to optimise irrigation, fertilisation, weed and pest control
- **Food safety:** Monitor processing for safe production
- **Food quality:** Monitor processing to comply with quality standards
- **Nutrition:** Analyse consumer preferences to get insights on how to better develop food that is healthier and customised to address individual consumer needs
- **Production:** Improve planning of processing to optimise manufacturing
- **Skills:** Support workers with limited skills to inform decision-making
- **Traceability:** Enhance transparency from farm to table with AI-driven tools
- **Transportation:** Optimise delivery routes to reduce emissions and monitor perishable items

To support the development of AI, the Commission has announced in January 2024 the '**GenAI4EU initiative**'⁽⁹⁰⁾, which aims to support the development of novel use cases and emerging applications in all Europe's industrial ecosystems, as well as the public sector. Application areas include robotics, health, biotech, manufacturing, mobility, climate and virtual worlds. It will be crucial to explore together with the agri-food stakeholders how this programme could be best used to address the needs within the agri-food ecosystem. The TPP will be the main platform to be used for these exchanges.

However, it must be emphasised that AI's transformative potential in optimising food production and sustainability is closely tied to the **quality and availability of the underpinning data**. The latter is an important aspect echoed by stakeholders in the co-creation process. Despite the increasing availability of innovative hardware and software solutions, there is a notable lag in the development of data access, protection and management solutions. Yet, these are essential for establishing trusted platforms for data sharing and ensuring interoperability across agri-food value chains. Therefore, ensuring transparent collection, safe storing, greater accuracy, and improved accessibility to relevant data is of high importance to untap the potential of AI's and other technologies' benefits. The work done thanks to the Connecting Europe Facility, Digital Europe Programme, sectoral **Testing and Experimentation Facilities** (TEFs) and **European Digital Innovation Hubs** (EDIH) are also worth mentioning in this context, as well as the Common European Agriculture Data Space. This Data Space will facilitate the trustworthy pooling, sharing, and use of agricultural data between farmers, machinery companies, data service providers, and public authorities. All these initiatives are the key instruments to support investments in and implementation of digital and data solutions, that require better application in the agri-food sector.

The role of **biotechnology, biomanufacturing and biobased industries** was highly praised by stakeholders. To support R&I and the technological uptake of biotechnology, the Commission is working on the launch of the EU Biotechnology and Biomanufacturing Initiative, expected to be published in March 2024. In this context the **Circular Bio-based Europe Joint Undertaking (CBE JU)** should be mentioned, which brings together private and public actors to support innovation and deployment of circular bio-based solutions. The CBE JU covers agri-food residual biomass use and food-related R&D, including probiotics, agrochemicals and packaging, as well as many other non-food applications. The bioeconomy working group of the European Regions Research and Innovation

⁽⁹⁰⁾ European Commission (2024). [GenAI4EU initiative](#)

Network (ERRIN) also provides relevant input regarding bioeconomy in the context of Horizon Europe and the Circular Bio-based Europe Partnership. ⁽⁹¹⁾

Protein diversification was another element brought forward by stakeholders. Proponents of alternative proteins call for faster authorisation processes to prevent innovation slowdowns. Understanding the sustainability and consumer acceptance of these novel foods necessitates more R&I, according to stakeholders. Several initiatives aim to explore protein diversification, such as the Food 2030 pathway ‘Alternative proteins for dietary shift’ and the EIT Food Protein Diversification Think Tank.

In light of the available technologies and related R&I initiatives, it is crucial to **identify enablers that could provide a boost to innovation**. For example, **showing best practices** to catalyse the uptake of innovative technologies via online platforms such as the Transition Pathway Platform (TPP) could be a way to showcase implementation solutions. Moreover, the TPP could be used to **increase awareness** of existing R&I funding opportunities, especially for SMEs. Lack of awareness has been raised by many stakeholders as a major obstacle (see also chapter 4.7). Hence, awareness raising is crucial and highly sought after. This is why a mapping of EU financing opportunities has been created as part of the co-creation process (see Annex 7.1).

EU funding opportunities for R&I in the agri-food ecosystem are mainly implemented through the **Horizon Europe programme** ⁽⁹²⁾, specifically under Cluster 6, called ‘Food, Bioeconomy, Natural Resources, Agriculture & Environment’. The Mission ‘**A Soil Deal for Europe**’ supports R&I for healthy soils and sustainable food systems, including food waste reuse for soil improvement ⁽⁹³⁾. However, other significant funding opportunities beyond Horizon Europe also exist. The Common Agricultural Policy (CAP) has backed the **European Innovation Partnership for Agricultural Productivity and Sustainability** (EIP-AGRI), for example, bridging R&I efforts funded by the CAP and Horizon Europe to enhance competitiveness and sustainability in farming and forestry. Additionally, **LIFE** is an EU funding programme that focuses on supporting environmental and climate action projects across Europe ⁽⁹⁴⁾. Also, the recently released Pathfinder, Transition and Accelerator programmes of the **European Innovation Council** (EIC) allocate support to innovations demonstrating potential for significant breakthroughs and disruptive impact.

The consultation has showed that stakeholders would like to prioritise collaboration, including through **public-public and public-private partnerships**, to foster R&I as well as uptake of innovative solutions. Under Horizon Europe, collaboration is fostered across various entities, aligning with the goal of enhancing such partnerships. Several agri-food relevant Horizon Europe partnerships are under development, such as the co-funded ‘**Sustainable Food Systems for People, Planet and Climate**’ partnership. Other European partnerships that are already operational include ones focused on agroecology, living labs and research infrastructures, animal health and welfare, and data ⁽⁹⁵⁾. Additionally, the ‘**Partnership on Research and Innovation in the Mediterranean Area**’ (PRIMA) develops solutions for a more sustainable management of water and agri-food systems in the Mediterranean basin ⁽⁹⁶⁾.

Furthermore, the **European Institute of Innovation & Technology** (EIT) enables partnerships within a diverse network of businesses, research institutions and universities to collaborate on innovative solutions for the food industry. Amongst others, **EIT Food** focuses on fostering

⁽⁹¹⁾ ERRIN. [Bioeconomy working group](#)

⁽⁹²⁾ Horizon Europe, as part of the MFF has a budget of €95,5 billion (including €75,9 billion from the MFF and €5 billion from the Next Generation Europe) to spend over a seven-year period (2021-2027).

⁽⁹³⁾ Under Pillar II.

⁽⁹⁴⁾ [LIFE – European Commission](#).

⁽⁹⁵⁾ European Partnership under Horizon Europe (2022). [Agriculture of Data](#)

⁽⁹⁶⁾ [PRIMA – European Commission \(europa.eu\)](#)

entrepreneurship, developing educational programmes and bolstering agri-food tech scale-ups and start-ups. Similarly, industry-led **European Technology Platforms** (ETPs) play a pivotal role in advancing innovation, knowledge exchange and competitiveness. For instance, the ETP ‘Food for Life’ is instrumental in developing a collaborative research agenda tailored to the agri-food sector ⁽⁹⁷⁾. Lastly, the National Food Technology Platforms (NFTPs) are also noteworthy, which consist of national networks in the agri-food industry.

Another important issue that emerged from the public consultation is the **strategic importance of the national and regional level** in terms of R&I promotion. Leveraging established networks and focusing on actionable projects with high technology readiness levels (TRLs) requiring scaling-up investments will be crucial to enhance regional focus and support. In addition, alongside the establishment of advanced digital infrastructure in rural and urban areas, supporting the implementation of regional initiatives across Member States can further boost R&I.

Relevant to mention in that regard are the **‘Regional Innovation Valleys for Bioeconomy and Food Systems’** (RIV4BFS) ⁽⁹⁸⁾. These Valleys have been launched by the Commission as thematic use cases in support of the communication ‘New European Innovation Agenda’ (NEIA) and its flagship initiative on ‘Regional Innovation Valleys’ (RIVs). Regional Innovation Valleys aim to harness the potential of deep-tech innovation across the different EU territories, by scaling up and speeding up solutions in various technological areas, increasing interconnectedness within the EU and promoting access to funding. RIV4BFS are pursuing concrete and specific goals, ones that supports the transition to sustainable and circular bioeconomies and/or food systems. They are aligned with smart specialisation strategies and their strengths and priorities. Possible examples might include establishing a zero-waste valley and reaching a net-zero local food system.

Finally, stakeholders emphasised that R&I and the implementation of new technologies can present significant challenges for **SMEs**, primarily due to their limited financial and human resources. It is therefore vital to acknowledge the vital role of SMEs and start-ups in the innovation landscape. Acknowledging their achievements through activities such as **award events** offers them much-needed recognition and can be a platform for exchange. Initiatives such as the **EIT Food Design Award** ⁽⁹⁹⁾ and **Ecotrophelia** ⁽¹⁰⁰⁾, a competition focused on developing eco-innovative food products, are relevant examples. For agriculture specifically there are also the EIP-AGRI Innovation Awards organised by the European CAP Network ⁽¹⁰¹⁾.

Chapter 4.4 is particularly relevant to aspirational objectives 2, 3, 4 and 6 of the EU Code of Conduct on Responsible Food Business and Marketing Practices

Action	Actors	Timeframe
17. Promote and create public-private and public-public partnerships , harnessing collective expertise, resources, and capacities, to enhance the uptake of innovative sustainable practices	EU / EU MS / Private sector	Short / Medium
18. Foster collaboration for mutual benefits along the value chain by encouraging and engaging in partnerships between large business operators	EU / EU MS / Private sector	Short / Medium

⁽⁹⁷⁾ FoodDrinkEurope. [Food for life](#)

⁽⁹⁸⁾ [Regional Innovation Valleys for Bioeconomy and Food Systems](#)

⁽⁹⁹⁾ [EIT Food Design Award](#)

⁽¹⁰⁰⁾ [Ecotrophelia](#)

⁽¹⁰¹⁾ [EIP-AGRI Innovation Awards 2024 | European CAP Network \(europa.eu\)](#)

and SMEs , aiming to boost efficiency, spur innovation and expand market access		
19. Increase the awareness of R&I funding opportunities in Member States and regions, with a specific focus on SMEs, encompassing exchange and use of knowledge and innovation, including scale-up activities	EU MS	Short / Medium
20. Showcase best practices on the TPP to catalyse the uptake of innovative solutions	EU / Private sector	Short / Medium
21. Increase the enabling potential of digitalisation solutions , more specifically regarding voluntary 'data' access and standardisation, based on international standards	EU / EU MS / Private sector	Short / Medium
22. Identify needs for AI solutions in the agri-food ecosystem, specifically to be addressed by the Generative AI initiative , with the help of the TPP	EU / Private sector	Short / Medium
23. Explore innovative agri-food technologies such as precision fermentation, including through the EU Biotech and Biomanufacturing Initiative, to accelerate the use of such cutting-edge solutions and boost EU competitiveness	EU / EU MS	Medium / Long
24. Facilitate the transition of high TRL projects into the market by promoting scale-up activities, like investments in infrastructure, and enhancing market access through established networks, like industry associations	EU MS / Private sector	Short / Medium
25. Support the implementation of the Regional Innovation Valleys for Bioeconomy and Food Systems initiative in regions and Member States	EU MS / Private sector	Short / Medium
26. Foster SME and start-up award activities and events	EU MS / Private sector	Short / Medium
27. Advance the pathways laid down in ' Food 2030 Research and Innovation – Pathways for action 2.0 ' to foster R&I at EU level	EU / Private sector	Medium / Long

4.5 The single market and infrastructure

To realise the transition towards a more sustainable agri-food ecosystem, several prerequisites need to be safeguarded, as stated by many stakeholders during the public consultation. One of them is the **proper functioning of the EU's single market**. Although the single market has fuelled economic growth during the past decades and made the life of European businesses and consumers easier, there are still **events or issues that can put its development, maintenance or expansion at risk**. In response to a question in the consultation about these risks, stakeholders have remarked that the preference for directives over regulations can lead to inconsistent implementation across the EU, for instance. Moreover, there can be a lack of uniformity in national regulations, such as on food labelling related to environmental impact. Packaging rules and approaches to the circular economy can also vary across Member States. In addition to Member State actions, there are private actions that can impact the free movement of goods, such as territorial supply constraints.

To address **single market barriers**, numerous initiatives are already in place, as also indicated in the agri-food transition pathway SWD. An important aspect that was highlighted in the consultation is that national authorities should work closely with European authorities to ensure the smooth implementation of EU rules. The **Single Market Enforcement Taskforce** (SMET) is the main platform for such exchanges. The Commission and Member States meet regularly in the context of the SMET, to jointly determine the most significant and urgent barriers in the single market and cooperate to eliminate or ease them. This is also done through specific projects, such as the project on protectionist measures concerning agri-food products ⁽¹⁰²⁾. In February 2024, the 2024 **Annual Single Market and Competitiveness Report** (ASMCR) Communication was adopted. With this exercise, the Commission annually takes stock of the single market. To do so, the Report also included two SWDs, the 2024 Single Market and Competitiveness Scoreboard and the 2022-2023 report of the SMET ⁽¹⁰³⁾. Additionally, the **Single Market Transparency Directive** (SMTD) legally mandates that all relevant national initiatives are analysed through the **Technical Regulation Information System** (TRIS).

Looking at **concrete infrastructure** instead of regulatory aspects within the single market, stakeholders have mainly raised issues related to transport, energy and digitalisation. Starting with **transport**, it has been noted that there is the need to improve the transport for food, including input materials and chemicals, all over the EU, to ensure a smooth movement of food flows and to avoid surplus in some regions and shortages in others. During the COVID-19 pandemic, the Commission adopted Communications outlining the objectives and implementation of the **Green Lanes** – border crossings open to all freight vehicles carrying goods where any checks or screenings should take no more than 15 minutes. In light of the growing pressures on our food systems, in particular the COVID-19 pandemic, the Commission adopted in November 2021 a Communication on the Contingency plan for ensuring food supply and food security in times of crisis and established a European Food Security Crisis preparedness and response Mechanism (EFSCM). Furthermore, in May 2022, the Commission launched the Solidarity Lanes Action Plan to establish alternative logistics routes via rail, road and inland waterways, known as **Solidarity Lanes**. These Lanes were established to keep Ukraine's trade routes open so that goods can flow both to and from Ukraine, after Russia's war of aggression against Ukraine since February 2022 blocked this flow. Building on lessons learned during these crises, the Council of the EU and the European Parliament reached a provisional agreement on the **Internal Market Emergency and Resilience Act (IMERA)** in February 2024. The Council and Parliament not only agreed on the IMERA but also several accompanying legislative proposals (IMERA

⁽¹⁰²⁾ [Agri-Food - Projects - Single Market Enforcement Taskforce \(SMET\) - European Commission \(europa.eu\)](#)

⁽¹⁰³⁾ [The 2024 Annual Single Market and Competitiveness Report - European Commission \(europa.eu\)](#)

omnibus), to anticipate, prepare for and respond to the impact of future crises using the strength of the internal market.

The second main issue to be addressed for most stakeholders, including retailers, is **energy**. Food processing is highly dependent on energy supply for heating and cooling operations ⁽¹⁰⁴⁾. Stakeholders shared that in food manufacturing not only shortages, or the inflation of energy costs, are challenging, but also simultaneously **planning and investing in renewable energy**. To move towards a decarbonised and affordable energy transition, a solution could be for actors of the same geographical area to form energy communities. Through a participatory and collective approach, **energy communities** can enable larger scale resilient projects, stability of energy costs and make it easier to attract private investments in the clean energy transition ⁽¹⁰⁵⁾.

Lastly, stakeholders highlighted the relevance of data spaces, as also already discussed in the previous chapter. Data spaces are deliverables of the European Strategy for data, which includes a range of measures to enable the data economy. The objective of the **agricultural data space** in particular is to develop a trusted data space to allow the agricultural sector to share and access data ⁽¹⁰⁶⁾. The deployment of the agricultural data space should allow to exploit synergies with other common European data spaces, and to enable the development of data-driven applications and business models for the large variety of agri-food business needs. Digital infrastructure paves the way for innovation and improved efficiency in the agri-food ecosystem, as also discussed in the previous chapter and chapter 4.7.

Chapter 4.5 is particularly relevant to aspirational objectives 3, 4, 6 and 7 of the EU Code of Conduct on Responsible Food Business and Marketing Practices

Action	Actors	Timeframe
28. Make full use of the established single market instruments , such as the Single Market Enforcement Taskforce, to address market barriers at Member State level	EU / EU MS	Short / Medium / Long
29. Anticipate, prepare for and respond to the impact of crises on the single market through the implementation of the new IMERA, ensuring the free movement of goods and services	EU / EU MS / Private sector	Short / Medium / Long
30. Communicate on collaboration and funding opportunities regarding renewable energy , especially Renewable Energy Communities, as well as electrification of heat supply, e.g. by means of industrial heat pumps	EU MS / Private sector	Short / Medium
31. Further connect agri-food ecosystem actors with the agriculture data space to enable the development of robust data-driven applications	EU MS / Private sector	Short / Medium

⁽¹⁰⁴⁾ The Energy-Intensive Industries (EII) ecosystem covers a broad range of sectors such as chemicals, steel, paper, plastics, mining, extraction and quarrying, refineries, cement, wood, rubber, non-ferrous metals, glass and ceramics.

⁽¹⁰⁵⁾ European Commission, [Energy Communities](#)

⁽¹⁰⁶⁾ European Commission, [Digital strategy](#)

4.6 Skills

In the framework of the **European Skills Agenda** the European Commission is addressing the skills needs of the industrial ecosystems, including the agri-food ecosystem. The Commission has organised multiple high level round tables for the ecosystems, for example, with the roundtable to discuss skills in the agri-food ecosystem taking place in February 2021. Discussions during this roundtable showed that a skilled workforce is crucial to ensure a successful transition, support the competitiveness of the European economy and the quality of job creation in the agri-food sector ⁽¹⁰⁷⁾.

The agri-food ecosystem **needs human resources in all the different subsectors**, even though it also faces specific skills-related shortages. There is an increasing need for highly skilled workers (such as agronomists, machinery and contact material specialists, circular and biotech experts, veterinarians, and food scientists and technologists) in the different sub-sectors, but there is often a gap between universities and ‘vocational schools’ curricula and real-life industry skill requirements. There are specific concerns regarding generational renewal and attracting talent, mostly in agriculture ⁽¹⁰⁸⁾, but also in food industry, food services and all related industries in the value chain, including retail ⁽¹⁰⁹⁾. As reported by the OECD, the EU agri-food sector is expected to lose 13% of low skilled workers in the next decade. At the same time, the demand for workers with higher level of entrepreneurial and management skills, digital know-how, business and marketing experiences is expected to rise. These developments will increase the already existing skills gap ⁽¹¹⁰⁾.

The questions of the public consultation for this transition pathway specifically asked about the skills needed for the agri-food ecosystem to achieve sustainability and resilience. Stakeholders were largely in agreement regarding the primary skills gaps:

- Digital skills
- Sustainability skills
- Soft skills
- Food system approach related skills
- Efficient use of resources and logistics skills
- Highly skilled professions
- Innovative solutions skills
- Risk management skills
- Financial and economic skills
- Legislation and regulation skills
- Food safety management skills
- Food quality management skills
- Food packaging skills
- Bioeconomy related skills
- Administrative skills
- Impact management skills
- Crisis management

The **Pact for Skills** ⁽¹¹¹⁾ is a flagship initiative of the European Skills Agenda, which is also framed by the EU Industrial Strategy ⁽¹¹²⁾. In February 2022, the Commission supported stakeholders in the

⁽¹⁰⁷⁾ European Commission (2021). [Meeting report: Pact for Skills Roundtable with Commissioners Schmit and Breton for the Agri-food Ecosystem](#)

⁽¹⁰⁸⁾ European Commission (2022). [Promoting education, training & skills in the bioeconomy : final report](#)

⁽¹⁰⁹⁾ EuroCommerce and McKinsey (2022). [The State of Grocery Retail 2022](#)

⁽¹¹⁰⁾ OECD (2023). [Labour and skills shortages in the agro-food sector](#)

⁽¹¹¹⁾ European Commission, [Pact for Skills](#)

⁽¹¹²⁾ European Commission, [European Skills Agenda](#)

launch of a dedicated Pact for Skills Agri-food Large-scale Partnership ⁽¹¹³⁾. This skills partnership for the agri-food ecosystem, comprised of stakeholders such as EU associations, organisations and social partners, has committed to establishing a joint strategy to design and implement a sectoral education, training, upskilling and reskilling framework. This framework should maximise competitiveness of all actors involved and enhance job attractiveness and retention. The partnership is coordinated by the main EU associations of the agri-food sector: Copa-Cogeca (agriculture) and FoodDrinkEurope (food and drink industry). The partnership is currently working on establishing a data observatory, expanding its membership, and launching regional and national partnerships. EIT Food, which is also a member of the partnership, has developed and launched learning services for employers. These services are meant to provide support in recruitment, retention and career progression of innovation-active staff in the sector.

Another EU initiative led by EU agency Cedefop has focused on looking at **vocational education and training** (VET) and skills needs in the agri-food industry. Cedefop's report on this topic stresses that the future of skills for agri-food should aim at sustainability, business and soft skills. Moreover, it should focus on skills such as those related to resource and energy management ⁽¹¹⁴⁾. This work among others highlights the relevance of the recognition and resources that VET requires for a better implementation in the sector.

Up- and reskilling when it comes to **digital skills** is also key for the sector. Larger investments are required to allow for the up- and reskilling of the sector to use new technologies ⁽¹¹⁵⁾. The **Digital Europe Programme** includes specific actions on digital skills, such as the Networks of Excellence of European AI research centres ⁽¹¹⁶⁾ or the AI-on-demand platform ⁽¹¹⁷⁾.

The **Erasmus+ Centres of Vocational Excellence** (CoVE) initiative aims to be a driving force for reforms in the VET sector, ensuring high quality skills and competences that lead to quality employment and career-long opportunities. It also aims to meet the needs of an innovative, inclusive and sustainable economy, as well as social needs, and contribute to increasing the attractiveness of VET. The Erasmus+ CoVEs are 4-year projects, and each project can receive up to 4 million euros. The initiative has an indicative budget of €400 million to fund 100 CoVE projects in the period 2021-2027. There are several ongoing projects working on the skills challenges of the agri-food sector.

Looking at other funding sources, the **European Social Fund Plus** (ESF+) should be highlighted. It is one of the main resources for up- and reskilling opportunities, with €99.3 billion in total over the period 2021-2027. One-third of the ESF+ budget is dedicated to up- and reskilling – nearly €43 billion is invested in skills and training programmes across all EU Member States. These funds are managed by the Member States with a focus on up- and reskilling actions.

As discussed in chapter 4.4 on the social dimension, the EU and national **social partners** are key to tackle skills gaps. EFFAT (the European Federation of Food, Agriculture, and Tourism Trade Unions) and FoodDrinkEurope (the European food and drinks industry association) dedicated the project 'Delivering high-level food industry skills in the digital economy' to digital skills, for example ⁽¹¹⁸⁾. Geopa-Copa (the European Employers' Group of Professional Agricultural Organisations) and EFFAT are currently involved in a dedicated project on skills which is also a part of the broader agri-food Pact for Skills partnership.

⁽¹¹³⁾ European Commission, [Pact for Skills](#)

⁽¹¹⁴⁾ CEDEFOP (2023). [Growing green: How vocational education and training can drive the green transition in agri-food](#).

⁽¹¹⁵⁾ European Commission (2020). [Advanced Technologies for Industry. Sectoral Watch. Technological trends in the agri-food industry](#)

⁽¹¹⁶⁾ [European Network of AI Excellence Centres](#)

⁽¹¹⁷⁾ [AI on Demand](#)

⁽¹¹⁸⁾ European Federation of Food, Agriculture and Tourism Trade Unions (EFFAT) and FoodDrinkEurope (2019). [New professions and career paths in the food and drink industry: Delivering high-level food industry skills in the digital economy](#)

Sectoral organisations and companies also develop up and reskilling activities. In the consultation, a business association for example reported that its members employ a number of different strategies to fill vacancies. These strategies include training programmes, process automation and staff referrals. Other solutions are internal restructuring, employer-brand management, participation in job fairs, support for staff mobility and active headhunting campaigns.

Chapter 4.6 is particularly relevant to aspirational objective 5 of the EU Code of Conduct on Responsible Food Business and Marketing Practices

Action	Actors	Timeframe
32. Promote and expand the activities of the Agri-food Large-scale Partnership established under the Pact for Skills	EU / EU MS / Private sector	Short / Medium
33. Enhance the awareness of the ESF+ and other funding and financing opportunities to increase the number of agri-food beneficiaries	EU / EU MS	Short / Medium
34. Improve education and VET programmes for better up- and reskilling of the workforce and to increase the attractiveness of the sector to young people	EU / EU MS / Private sector	Short / Medium
35. Increase mentoring, apprenticeship and life-long learning programmes for a better adaptation to the skills gap	EU MS / Private sector	Short / Medium
36. Increase the awareness of already existing initiatives on up- and reskilling , such as local, national and regional skills partnerships, including those established under the Pact for Skills	EU MS	Short / Medium

4.7 Investments and funding

Private as well as public investments and funding in the agri-food ecosystem are crucial to achieve its transition towards resilience, sustainability and digitalisation. However, most companies in the sector (99%) are **SMEs with constrained resources**. This high fragmentation impedes economies of scale, reinforcing external financing needs⁽¹¹⁹⁾. According to the FI-Compass study⁽¹²⁰⁾ **investors and banks often show reluctance to invest** when encountering low equity ratios and margins, long payback periods and a lack of benchmark data for assessing investments. Despite these challenges, the agri-food sector has achieved a 27% increase in investment volume since 2011⁽¹²¹⁾. Yet, this significant increase in capital volume is still insufficient to meet the sector’s financing needs. Estimates indicate a financing gap in the agri-food sector ranging from €19.7 to €46.6 billion for agriculture and up to €12.5 billion for agri-food. For the latter gap, 78% affects small agri-food

⁽¹¹⁹⁾ European Investment Bank, European Commission (2019). [Feeding future generations. how finance can boost innovation in agri-food. executive summary](#)

⁽¹²⁰⁾ European Investment Bank, European Commission (2023). [FI-Compass study](#)

⁽¹²¹⁾ European Investment Bank, European Commission (2020). [Financial needs in the agriculture and agri-food sectors in the European Union](#)

businesses and 57% is associated with long-term loans ⁽¹²²⁾. Other studies estimate the costs for the first year of an EU-wide transition to more sustainable agricultural production on €25-35 billion ⁽¹²³⁾. Consequently, **investment is crucial for transforming agri-food systems, but faces challenges due to decreasing trends and sector-specific finance hurdles**. Low profit margins discourage modernisation investments, favouring fixed assets. Overall, the five main finance demand drivers in the agri-food sector are efficiency, capacity, compliance, product differentiation and working capital ⁽¹²⁴⁾.

The agri-food sector, as indicated in the 2022 Annual Single Market Report ⁽¹²⁵⁾, shows **moderate investment levels** in both digital and green transitions compared to other industries. About half of agri-food companies have already invested in digitalisation in response to COVID-19 and nearly 60% plan long-term investments. In terms of the green transition, over 40% of companies are actively investing in carbon emission reduction and risk mitigation, aligning with the average across industries. More than half plan to further invest in these areas in the coming three years. During the co-creation process, stakeholders put emphasis on several essential investment areas, including:

- Renewable and green energy sources
- Digital infrastructure and technology
- Circularity and waste infrastructures
- Market development and consumer education
- Research, development and innovation
- Skills, training and education
- Resource efficiency

SME stakeholders pinpointed several **key barriers to investment and access to finance**, such as limited resources and skills, strict requirements and burdensome application processes. These barriers also included low profit margins, high perceived risks by potential investors, and missing information about funding and financing opportunities.

Elevating awareness about the critical investment needs and their potential for transformative change represents a vital first step. By **showcasing success stories** of sustainable transitions on the upcoming Transition Pathway Platform, the urgency, challenges and benefits of investments could be effectively highlighted. This action would not only underscore the need for investments but can also act as a catalyst spurring further investment commitments.

Although the investment needs are evident, stakeholders have highlighted a **considerable gap in awareness** regarding available funding and financing options, resulting in severe obstacles and highlighting a demand for better information dissemination. In response, a summary of the main funding schemes for the agri-food ecosystem has been compiled by the European Commission. Annex 1 lists these opportunities, outlining key programmes and contributions from the Commission and the responsible directorates. Moreover, this chapter also outlines schemes relevant to the identified investment needs.

The EU's 2021-2026 budget, the **Multiannual Financial Framework** (MFF), together with the **NextGenerationEU** recovery instrument, totals over €2 trillion ⁽¹²⁶⁾. A significant portion of the NextGenerationEU funds will be channelled through the **Recovery and Resilience Facility** (RRF)

⁽¹²²⁾ European Investment Bank, European Commission (2020). [Financial needs in the agriculture and agri-food sectors in the European Union](#)

⁽¹²³⁾ FoodDrinkEurope (2024). [Funding the EU Transition to more sustainable agriculture](#)

⁽¹²⁴⁾ European Investment Bank, European Commission (2020). [Financial needs in the agriculture and agri-food sectors in the European Union](#)

⁽¹²⁵⁾ European Commission (2022). [Annual Single Market Report 2022](#)

⁽¹²⁶⁾ A €806.9 billion temporary recovery instrument.

programme. Stakeholders that responded to the consultation highlighted the importance of directing RRF resources to the agri-food ecosystem.

Investments in R&I are regarded as crucial to facilitate a successful green and digital transition, including in areas such as soil health, plant protection, climate-resilient crops, novel food processing, bio-solutions and alternative proteins. In 2019, the agri-food sector's annual R&I investment in Europe was €3 billion, significantly lower than in sectors such as health, which saw €41 billion. Stakeholders also advocate for more strategic research which is directly relevant and applicable to the operations of producers. The **Horizon Europe Programme** (discussed in section 4.4) is the world's largest public R&I programme (€95.5 billion within the 2021-2027 EU budget). The programme's Cluster 6 'Food, Bioeconomy, Natural Resources, Agriculture and Environment' has an overall budget of around €9 billion.

The EU's commitment to boost investments in digitalisation is underpinned by a range of funding and financing initiatives. The Recovery and Resilience Facility (RRF) currently allocates 26% of its funds to digitalisation projects, particularly targeting reforms and investments in SMEs and advanced technology uptake ⁽¹²⁷⁾. Complementing this, the **Connecting Europe Facility** focuses on building robust digital infrastructure, such as 5G networks and narrowband IoT systems, prioritising connectivity in remote areas. It also supports agri-food-specific applications like livestock monitoring ⁽¹²⁸⁾. The **Digital Europe Programme** further aims to enhance this landscape with significant investments in AI, cybersecurity and digital skills development. It also incorporates **Testing and Experimentation Facilities** (TEFs) in the agri-food sector that are meant to bolster the deployment of novel solutions, such as industrial AI tools, to move to a more circular economy. Additionally, the Commission fosters the digital transition of businesses and the public sector through the establishment of a network of **European Digital Innovation Hubs** (EDIH). These EDIHs offer a range of services, including assessing digital maturity, giving advice on technology, fostering cross-sector collaboration and partnerships, and facilitating access to finance. All of these services contribute to streamlining the transition towards a more interconnected and innovative digital Europe.

Regarding the green transition, the EU's **LIFE programme** represents a major funding instrument. It supports projects in almost all Member States to help achieve Europe's 2050 climate neutrality goal, 2030 biodiversity targets and a circular economy ⁽¹²⁹⁾. Similarly, the **Innovation Fund** ⁽¹³⁰⁾ offers financial support for innovative low-carbon technologies, contributing to greenhouse gas reduction.

These efforts are further supported by sustainable finance measures like the **Taxonomy Regulation**. This Regulation already establishes, via delegated acts, technical screening criteria for certain economic activities to qualify as a 'significant contribution' to climate mitigation and adaptation, circular economy, pollution, water and biodiversity objectives. As such, it encourages private sector investment in green and sustainable projects in line with the European Green Deal ⁽¹³¹⁾. The European Green Deal investment plan also includes the **Just Transition Mechanism**, aimed at mobilising investments to assist regions most impacted by the transition ⁽¹³²⁾.

Another key resource for many stakeholders in the ecosystem remains the **Common Agricultural Policy** (CAP). Notably, the **CAP Strategic Plans** aim to propel digital transformation in agriculture and rural areas by integrating digital strategies in each plan ⁽¹³³⁾. The EAFRD is the funding instrument of the second pillar of the CAP with a budget of €95.5 billion for 2021-2027 and an addition of €

⁽¹²⁷⁾ European Commission, [Recovery and Resilience Facility - Performance](#)

⁽¹²⁸⁾ European Commission (2021). [Connectivity: key to revitalising rural areas](#)

⁽¹²⁹⁾ [LIFE - European Commission \(europa.eu\)](#)

⁽¹³⁰⁾ [Innovation Fund - European Commission \(europa.eu\)](#)

⁽¹³¹⁾ European Commission, [Finance and the Green Deal](#)

⁽¹³²⁾ European Commission, [Finance and the Green Deal](#)

⁽¹³³⁾ [CAP Strategic Plans](#)

8.1 billion. The reformed CAP focuses on transforming the agricultural sector into a smarter, more sustainable and resilient system. In its implementation it offers financial instruments acting as a source of loans, microcredit, guarantees and equities.

The **European Maritime, Fisheries and Aquaculture Fund** (EMFAF) supports the objectives of the **Common Fisheries Policy** (CFP) of achieving economic, social and employment benefits, and contributing to the availability of food supplies. Through its € 6.1 billion budget (2021-2027) the EMFAF supports these objectives through fostering sustainable fishing activities, sustainable aquaculture and providing conditions for the sector to be competitive. It also does so through supporting structural management, contributing to a fair standard of living, and other activities.

Furthermore, the **Technical Support Instrument** (TSI), a demand driven instrument with a budget of €864 million from 2021 to 2027, offers tailored technical assistance for reforms in Member States. Various Member States are already leveraging these funds to address the green and digital transition in the agri-food sector. ⁽¹³⁴⁾

Beyond public funding, stakeholders underscore the importance of other financial tools and private finance channels that are particularly difficult to access for SMEs. **InvestEU**, with a €26.3 billion EU guarantee, aims to generate €372 billion in additional investments for the EU economy. It offers loans and other financial products for agri-food and rural businesses, with a focus on various sectors, including the bioeconomy and circular economy. Under so-called Framework Operations, the **European Investment Fund** (EIF) has created financial products amounting to €7.8 billion. Member States can also enhance support through InvestEU's Member State compartment. Additionally, the **European Investment Bank** (EIB) can directly lend to large-scale agri-food projects and indirectly support the sector's transition through intermediate lending. **BlueInvest** aims to support early-stage businesses and allocates €20 million (through EMFAF) annually from 2021 to 2027 to the fund 'InvestEU Blue Economy'. The fund generates up to €500 million in EU risk finance over the upcoming years (2021-2027), leading to the availability of up to €1.5 billion for investments in innovative blue economy SMEs. Furthermore, the Commission's **Smart Specialisation Platform for Agri-Food** (S3P Agri-Food) facilitates investment projects in agri-food smart specialisation priorities. Regions, industry, research institutions and civil society are all involved in this platform. **EIT Food** also connects agri-food tech start-ups with potential investors to launch, accelerate or scale up ⁽¹³⁵⁾. Lastly, the challenges for the **EIC Accelerator Work Programme 2025** should be aimed at providing further financial support to the food industry.

Stakeholders have strongly underlined the necessity for increased support to SMEs. Acknowledging the pivotal role of SMEs in the ecosystem, it is evident that there is an essential requirement for easier access to available finance options to facilitate the ecosystem's transition. Food SMEs can benefit from the **Single Market Programme** (SMP), aimed at improving the governance of the single market and supporting the competitiveness of companies, especially SMEs. The SMP has a budget allocation of about €4 billion for the 2021-2027 period, with €2 billion set aside under the **InvestEU Fund**, primarily to support its SME window. As reflected by stakeholders in the consultation, another severe obstacle is the lack of financial literacy and risk analysis capabilities. Again, this mainly concerns SMEs, and remains a ubiquitous issue across all ecosystems. Addressing this issue through local, regional and national schemes will be essential. As mentioned earlier, **European Digital Innovation Hubs** offer a variety of innovation services to SMEs, providing information as well as support in accessing finance.

⁽¹³⁴⁾ [Technical Support Instrument](#) in the agri-food sector.

⁽¹³⁵⁾ EIT-Food. [Entrepreneurship](#)

In summary, the agri-food ecosystem faces various obstacles in its green and digital transition, **demanding substantial investments and commensurate support** in terms of public and private funding. This includes raising awareness and accessibility of public and private funding, financing opportunities, collaboration across the supply chain, and public-private partnerships. These all serve as critical enablers of the twin transition.

Chapter 4.7 is particularly relevant to aspirational objectives 3, 4 and 6 of the EU Code of Conduct on Responsible Food Business and Marketing Practices

Action	Actors	Timeframe
37. Increase awareness amongst private sector actors, such as banks, of the investment needs of the agri-food ecosystem	Private sector	Short / Medium
38. Showcase company sustainability and digitalisation success stories on Transition Pathway Platform (TPP) to inspire more investments in the ecosystem	EU / Private sector	Short / Medium
39. Share information about funding and financing opportunities for the ecosystem by using the TPP as a 'one-stop-shop'	EU	Medium
40. Improve technical assistance and financial literacy and skills of agri-food SMEs through local, regional or national schemes to overcome barriers to funding and investments	EU MS	Medium / Long
41. Provide information on agri-food-focused incubators and accelerators to support SMEs	EU / EU MS	Short / Medium
42. Explore which challenges could be proposed for the EIC Accelerator Work Programme 2025 to financially support food industry	EU	Short

4.8 International trade and cooperation

The international dimension, both in terms of international trade and international cooperation, is key in realising the shift of food systems towards sustainability and resilience. It is very **important to consider the global perspective** and think systemically when considering the impact and dependencies of the EU agri-food value chain. Some examples of these challenges have been recently shown when considering the high **dependency of the EU** on agricultural inputs, raw materials, ingredients and energy supply from foreign countries.

The implementation of EU policies related to **imports from third countries into Europe** can be challenging ⁽¹³⁶⁾. These challenges have been highlighted by stakeholders in the consultation. They can jeopardise both the EU's competitiveness and the sustainability and resilience of the EU agri-food sector. Given that the EU is among the most efficient global producers of food in terms of environmentally sustainable production (e.g. because of less greenhouse gas emissions, and the use of carbon sequestration and renewable energy), the EU should work to prevent unfair competition and to ensure a **level playing field** with non-EU producers, particularly through trade agreements. This is also important to ensure environmental impacts are not shifted to third countries ⁽¹³⁷⁾. For instance, the EU is the largest importer of seafood in the world (60% of its supply) and, as such, has the responsibility to ensure a level playing field for legitimate operators and that only legal products access its market.

Food security is another key element to be considered, which could be enhanced by strategically diversifying the food supply. In the **Versailles declaration** from March 2022, Member States endorsed the reduction of the EU's agri-food dependencies as a priority. As mentioned in the Commission Communication on food security, work should therefore be stepped up, particularly with regard to the resilience of agricultural input chains, the supply of plant proteins, animal feed, as well as processed products from the sea and aquaculture, and the availability and affordability of key food ingredients ⁽¹³⁸⁾.

The SWD for this transition pathway, published in July 2023, already introduced some key references regarding imports and exports ⁽¹³⁹⁾. In 2022, the EU exported €182 billion and imported €110 billion in food and drinks, and the UK, the US, and China are the EU's largest trading partners, for example ⁽¹⁴⁰⁾. The EU remains highly competitive on the world market for many products. The EU is largely self-sufficient for key agricultural products, being a main wheat and barley exporter, and largely able to cover its consumption for other staple crops, such as sugar. The EU is also largely self-sufficient for animal products, including dairy and meat. Yet, for high protein animal feed such as soy the EU is still dependent on imports ⁽¹⁴¹⁾. The top three import product categories in agri-food in 2022 were oilseeds and protein crops, fruit and nuts, and the category of 'coffee, tea, cocoa and spices'. For fisheries and aquaculture products, the EU is a net importer. The seafood market has a high degree of import-dependency, the EU self-sufficiency being at 11% for the top five species consumed ⁽¹⁴²⁾. The EU's top food export categories include cereal preparations, dairy products, wine, cereals and mixed food preparations and ingredients. Products of the food and drink industry such as spirits and beer, and chocolate and confectionary, also have an important place in EU's export basket for food ⁽¹⁴³⁾.

The EU is committed to ensuring the sustainability of its trade relations, including for food products. Modern **EU Free Trade Agreements** (FTAs) contain rules on trade and sustainable development, and the latest agreements also include a chapter on 'Sustainable Food Systems'. The EU Regulation on deforestation-free products, in force since June 2023, aims to guarantee that imports into the EU of key agricultural and food products are deforestation-free ⁽¹⁴⁴⁾. The promotion of sustainability policies within FTAs is one of the actions under the EU's new trade policy. In this context the agreements being negotiated in the framework of the **World Trade Organization** (WTO) regarding

⁽¹³⁶⁾ Commission results of EU-wide action on honey adulteration. <https://ec.europa.eu/newsroom/sante/items/781304/>

⁽¹³⁷⁾ European Commission (2024). [Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable just and prosperous society](#)

⁽¹³⁸⁾ COM (2022). [Safeguarding food security and reinforcing the resilience of food systems](#)

⁽¹³⁹⁾ This includes both basic and processed agricultural products.

⁽¹⁴⁰⁾ European Commission (2023). [Monitoring EU agri-food trade](#)

⁽¹⁴¹⁾ European Environment Agency (2020). [EU animal feed imports and land dependency](#)

⁽¹⁴²⁾ European Market Observatory for Fisheries and Aquaculture Products, European Commission (2022). [The EU Fish Market, 2022 edition](#)

⁽¹⁴³⁾ FoodDrinkEurope (2023). [Data and Trends report](#)

⁽¹⁴⁴⁾ COM Regulation (EU) 2023/1115 on deforestation-free products.

agriculture and food security are important ⁽¹⁴⁵⁾. The 12th Ministerial Conference of the WTO adopted in 2023 a declaration on ‘Responding to Modern SPS Challenges’, which allows for a targeted dialogue on challenges related to sustainability ⁽¹⁴⁶⁾. The outcome of other more sectoral negotiations taking place within the WTO framework will also have an impact on the food systems’ resilience and sustainability ⁽¹⁴⁷⁾.

When it comes to international cooperation, the EU aligns with the Agenda 2030 and the Sustainable Development Goals ⁽¹⁴⁸⁾ of the UN, which have as main objective the achievement of a more sustainable, resilient and fair global food system. Food systems are highly interconnected and complex at global scale. EU activities, including policies aimed at achieving higher sustainability, may often affect third countries’ operations. Recognising this fact, the EU organises **targeted consultations** with developing countries and stakeholders. These actions intend to create a better understanding of the relevant issues and specific needs, to facilitate a transition to sustainable food systems, but also to minimise trade barriers. In addition, the EU, within the WTO framework, has a comprehensive system to address technical barriers to trade, based on a procedural dialogue ⁽¹⁴⁹⁾. To achieve better communication the Commission already offers technical assistance in the form of **capacity building** to developing countries ⁽¹⁵⁰⁾, the Western Balkans and Türkiye ⁽¹⁵¹⁾. Specific international projects often channel the required aid to third countries in terms of food insecurity, health and nutrition, climate change, biodiversity loss, ocean degradation and pollution. The Food and Agriculture Organisation (FAO) is often key to provide coordination of **country-level food systems assessments** ⁽¹⁵²⁾.

The financial support offered by the **Neighbourhood, Development and International Cooperation Instrument – Global Europe** (NDICI-GE), which provides support through different financial instruments, should particularly be highlighted ⁽¹⁵³⁾. The implementation of this programme and other public or private investments to support a green and digital transition requires cooperation between EU Member States, financial institutions and the private sector. The promotion of such financial instruments is a key enabler for primary producers and food businesses, including SMEs.

The EU actively promotes relevant EU initiatives, such as the Farm to Fork Strategy, to raise awareness about sustainable food systems within third countries. The aim of this outreach is to create a mutual understanding with third countries and regions and establish areas for cooperation. The EU often establishes this dialogue through international **multilateral forums** ⁽¹⁵⁴⁾. The principles of the Farm to Fork and One Health approach are also promoted through international standards setting bodies ⁽¹⁵⁵⁾.

Within this context it is relevant to recall the **UN Food Systems Summit** held in New York in 2021 ⁽¹⁵⁶⁾. The outcome of this relevant event for the conceptualisation of food systems has taken the

⁽¹⁴⁵⁾ [WTO and negotiations on agriculture to achieve food security](#)

⁽¹⁴⁶⁾ World Trade Organisation (2022). [Responding to Modern SPS Challenges](#)

⁽¹⁴⁷⁾ This is the case for instance of the WTO Agreement on Fisheries Subsidies adopted at the 12th WTO Ministerial Conference and the ongoing negotiations on subsidies contributing to overfishing and overcapacity, in which the EU is actively participating.

⁽¹⁴⁸⁾ [UN Sustainable Development Goals](#)

⁽¹⁴⁹⁾ [EU Technical Barriers to Trade Policy](#)

⁽¹⁵⁰⁾ Including through programmes such as [Fit For Market +](#)

⁽¹⁵¹⁾ European Commission (2022). [European Commission will support agriculture and rural development in the pre-accession countries with over €900 million](#)

⁽¹⁵²⁾ FAO. [Food Control System Assessment Tool](#)

⁽¹⁵³⁾ [Neighbourhood, Development and International Cooperation Instrument – Global Europe \(NDICI – Global Europe\)](#)

⁽¹⁵⁴⁾ Such as the FAO, the World Health Organisation (WHO), the United Nations Environment Programmes (UNEP), the World Trade Organisation (WTO), the International Fund for Agricultural Development (IFAD), the Organisation for Economic Co-operation and Development (OECD) and others.

⁽¹⁵⁵⁾ E.g. the Codex Alimentarius (FAO and WHO led), the World Organisation on Animal Health (WOAH) and the International Plant Protection Convention (IPPC).

⁽¹⁵⁶⁾ [UN Food systems summit 2021](#)

shape of different coalitions for action ⁽¹⁵⁷⁾. The Commission is part of coalitions for action focused on the following topics ⁽¹⁵⁸⁾:

- Food is never waste
- Healthy diets from sustainable food systems for children and all
- School meals
- Aquatic and blue foods
- Agro-ecology
- Zero hunger
- Fighting food crises along the humanitarian-development-peace nexus
- Sustainable productivity growth

Another example of the follow-up of the UN Food Systems Summit is the publication of the policy report ‘Everyone at the table: Transforming food systems by connecting science, policy and society’ ⁽¹⁵⁹⁾. This report explores in further detail the relevance and gaps of the science-policy-society interfaces, and how society engages in this process ⁽¹⁶⁰⁾.

Within the context of international multilateral dialogues, the 2023 edition Conference of the Parties of the **UN Framework on Climate Change** (UNFCC COP28) should be highlighted as well. During this event, 130 countries signed a declaration on ‘Sustainable Agriculture, Resilient Food Systems and Climate Actions’. Its aims include strengthening food systems and making them more resilient, reducing emissions and fighting hunger, in line with the UN SDGs. The FAO published a roadmap with the aim of reducing CO₂ emissions attributed to agriculture ⁽¹⁶¹⁾ covering 10 domains and 120 actions. In addition, the Convention on Biological Diversity (CBD COP15) and its international working groups on biodiversity and food systems are of relevance ⁽¹⁶²⁾. Moreover, the UN will dedicate the 24th meeting of its Open-ended Informal Consultative Process on Oceans and the Law of the Sea (New York, 18-21 June 2024) to the theme ‘The ocean as a source of sustainable food’.

Chapter 4.8 is particularly relevant to aspirational objectives 3, 5 and 7 of the EU Code of Conduct on Responsible Food Business and Marketing Practices

Action	Actors	Timeframe
43. Share experiences on EU actions proposed under strategies such as the Farm to Fork Strategy at international multilateral forums such as the FAO, WHO, OECD or WTO	EU / EU MS	Short / Medium
44. Provide support to international cooperation projects with third countries boosting entrepreneurship and market development in agri-food	EU / EU MS	Medium / Long
45. Support agri-food projects under the Neighbourhood, Development and	EU	Medium / Long

⁽¹⁵⁷⁾ [Coalitions of Action \(unfoodsystmshub.org\)](https://unfoodsystmshub.org) and published in the website of the Knowledge Centre for Global Food and Nutrition Security (2023). [Country priority actions for food systems transformation](#)

⁽¹⁵⁸⁾ European Commission (2022). [Food security: Commission steps up support for global action to transform food systems via eight Global Coalitions](#)

⁽¹⁵⁹⁾ P. Webb, R. Sonnino, E. Fraser, T. Arnold (2022). Everyone at the Table: Transforming food systems by connecting science, policy and society. European Commission Publications Office.

⁽¹⁶⁰⁾ P. Webb, R. Sonnino (2021). Everyone at the Table: Co-creating knowledge for food systems transformation. European Commission Publications Office.

⁽¹⁶¹⁾ [UNFCC COP 23 Food Systems Roadmap \(hosted by FAO\)](#)

⁽¹⁶²⁾ United Nations (2022). [CBD COP 15](#)

International Cooperation Instrument – Global Europe (NDICI-GE)		
46. Implement existing Free Trade Agreements , using where possible a Sustainable Food Systems chapter, to champion sustainable trade, in cooperation with trade partners and in line with other relevant EU policy instruments, incl. the Green Deal	EU	Short / Medium

5. NEXT STEPS

As explained in this transition pathway for the agri-food industrial ecosystem, the ongoing policy agenda for the agri-food ecosystem has already set in motion comprehensive strategies and actions, both on public and private side, such as the Farm to Fork Strategy. **Involving a wide range of stakeholders has helped to map where and how this implementation can be supported and accelerated** in a win-win approach, supporting the competitiveness of all actors along the value chain, especially smaller companies. The competitiveness and resilience of the agri-food value chain requires fair returns for all actors, as well as the optimisation of sustainability investments. This is crucial to better control food inflation, support the international attractiveness of EU agri-food exports and apply circular business models. The importance of sections on research and innovation, SMEs and the different investment and funding needs were specifically highlighted by stakeholders. Boosting digital solutions through better voluntary access to data, and the use of data spaces and artificial intelligence, are specifically of interest.

The next steps will focus on the **implementation phase with the help of stakeholders** and the continuation of reporting to achieve the different goals of the ecosystem. Considering the unprecedented challenges faced by the sector, the focus will be on providing enablers to support the stakeholders in the implementation and using existing reporting to avoid increased administrative burdens.

It is worth mentioning that whilst the ecosystem needs a clear food systems approach, the **focus of this document has mainly been the ‘middle part of the chain’**, not aiming for further commitments from primary producers. However, it is also relevant to explore the synergies with other ecosystems, such as retail, tourism and chemicals, and alignment with the actions in their transition pathways.

The co-creation process of this transition pathway has demonstrated that the objective of accelerating the sustainable transformation with the **EU Code of Conduct on Responsible Food business and Marketing Practices**, remains relevant, comprehensive and timely. However, the Code of Conduct requires further efforts for efficient, fair and competitive implementation by industry stakeholders ⁽¹⁶³⁾. As part of the transition pathway exercise, a platform will therefore be set up that will support stakeholders in sharing their pledges and best practices. Moreover, it will provide relevant information on other issues, such as policy updates and available funding schemes. The transition pathway does not substitute the Code of Conduct, but complements it by providing an additional framework for implementation and collaboration among stakeholders.

To facilitate the implementation of the transition pathway actions, funding has already been designated within the Single Market Programme to establish such a **Transition Pathway Platform**

⁽¹⁶³⁾ See e.g. [Action Plan for Sustainable and Resilient Food Systems](#)

for each ecosystem. Additionally, there will be ongoing budgetary commitments and resources dedicated to maintaining the content necessary for the continued operation of this structure. This support is planned for the next three years, starting from 2024, with the possibility of extension for a longer duration.

6. MONITORING AND CO-IMPLEMENTATION

As reflected in this document, the Farm to Fork Strategy remains the key strategy for the ecosystem. There is already a Commission initiative to create a **Farm to Fork Monitoring Framework**, which is intended to take the form of a publicly available dashboard of indicators. These indicators should cover all dimensions of sustainability (environmental, economic, social – including health) and all parts of the food chain. The dashboard will use existing indicators such as, among others, those from the CAP and the CFP, to analyse the most relevant aspects for monitoring the transition to a sustainable food system. It will also analyse where gaps might exist. This ongoing work will also draw on input from the ‘Advisory Group on Sustainability of Food Systems’, Commission Services and Member States (e.g. the Expert Group on the General Food Law and Sustainability of Food Systems). A first version of the dashboard should be completed in 2024 ⁽¹⁶⁴⁾.

Beyond this initiative, the CAP ⁽¹⁶⁵⁾ also provides monitoring tools for agriculture: the common monitoring and evaluation framework (CMEF) (for the period 2014-2020 and thus now finished) and the **performance monitoring and evaluation framework (PMEF)** (for the period 2023-2027) ⁽¹⁶⁶⁾. In addition, the new Farm Sustainability Data Network (FSDN) regulation will improve the sustainability of the EU’s food systems through an enhanced data collection process that takes into account environmental and social data, along with the economic data already collected via the Farm Accountancy Data Network (FADN) ⁽¹⁶⁷⁾. The European Food Security Crisis preparedness and response Mechanism (EFSCM) also sets some guidance for monitoring after the COVID-19 pandemic and crisis because of Russia’s invasion of Ukraine. For fisheries, the Commission annually requests the Scientific, Technical and Economic Committee for Fisheries to monitor the progress in achieving the maximum sustainable yield (MSY) exploitation rate in line with the objectives of the CFP Regulation.

Specifically focusing on the performance of industrial ecosystems, the Commission has set up the **‘Monitoring of European industrial ecosystems’** (EMI) project, which will include complementary KPIs and monitoring for the agri-food ecosystem ⁽¹⁶⁸⁾. Those Key Performance Indicators are ones that are not yet set elsewhere. The parameters used are meant for analysis within and between ecosystems. They include, for example, the number of patents in specific areas of technology, or the venture capital investment in the sector.

Stakeholder engagement is indispensable for the implementation of this transition pathway. The publication of the transition pathway for the agri-food industrial ecosystem acts in synergy with the process of stakeholder commitments as made under the **EU Code of Conduct on Responsible Food Business and Marketing Practices**, mostly by food industry and food retail. Stakeholders will be able to make new pledges on the upcoming Transition Pathway Platform. If their commitments align with the aspirational objectives of the Code of Conduct, they will automatically become a new signatory of the Code. For initiatives which go beyond the 7 specific objectives of the Code, stakeholders will have the possibility to submit a pledge under the transition pathway. Moreover, it

⁽¹⁶⁴⁾ European Commission (2022). Advisory Group on Sustainability of Food Systems. [Presentation of the Farm to Fork Monitoring Framework](#)

⁽¹⁶⁵⁾ European Commission (2023). [New CAP Strategic Plans 2023-2027](#)

⁽¹⁶⁶⁾ [European Commission CEMF and PEMF for monitoring of CAP](#)

⁽¹⁶⁷⁾ [FADN – European Commission \(europa.eu\)](#)

⁽¹⁶⁸⁾ [European Monitoring of Industrial Ecosystems \(EMI\)](#)

should be highlighted that transition pathways are not mutually exclusive. Hence, retail stakeholders that would wish to make a pledge under the agri-food pathway (i.e. under the Code of Conduct, if relevant) will still be able to make a pledge under the retail pathway.

Signatories of the Code of Conduct track progress of their commitments by submitting voluntary **annual reports** ⁽¹⁶⁹⁾. The Code of Conduct thus already requires reporting and would remain the main self-monitoring by stakeholders on their activities towards the transition. Additionally, an annual transition pathway report will be drafted by the Commission with a summary of the activities taking place on the Transition Pathway Platform. Because of the interlinkages between the Code of Conduct and the transition pathway, the annual report on the transition pathway will also touch upon the reporting through the Code of Conduct.

Finally, it should be mentioned that further reporting and indicators for the agri-food ecosystem at international level follow from the **Sustainable Development Goals** monitoring. There are reports available from 2016 onwards on the main parameters followed up in the 17 SDG actions ⁽¹⁷⁰⁾. The FAO also looks into monitoring (such as the Biodiversity Indicators Partnership) ⁽¹⁷¹⁾ and relevant monitoring work is also carried out by the OECD (Agricultural policy monitoring and evaluation) ⁽¹⁷²⁾.

⁽¹⁶⁹⁾ Their reports of 2022 and 2023 are publicly available: [Code of Conduct reporting](#)

⁽¹⁷⁰⁾ United Nations (2023). [The Sustainable Development Goals 2023](#)

⁽¹⁷¹⁾ [Biodiversity Indicators Partnership](#)

⁽¹⁷²⁾ OECD (2022). [Agricultural Policy Monitoring and Evaluation](#)

ANNEX 1: MAPPING OF EU FINANCING OPPORTUNITIES 2021-2027

The information provided in this annex was developed with the aim of having an informed discussion during the workshop on funding and investments. Although it is not based on any official document, it is the result of a mapping of funding opportunities done in September 2023.

Programme	Lead EC service	Description	Criteria/ Funding provisions
European Agricultural Fund for Rural Development (EAFRD)	AGRI	The EAFRD is the funding instrument of the second pillar of the EU's Common Agricultural Policy (CAP). The EAFRD budget for 2021-2027 amounts to €95.5 billion , with an addition of € 8.1 billion. The current funding line runs for the period 2023-2027, which among many others, supports investments in the agri-food sector. Most of these investment funds aim at farms (agriculture). Support for investments can be structured in the following way: infrastructure (€5.5 bn); off farm non-productive (€2.5 bn); off-farm productive (€6.1 bn); on farm non-productive investment (€10.8 bn) and on farm productive investment (€13 bn). These amounts include EAFRD funding plus MS co-financing and additional national top ups. Financial instruments (loans and guarantees) account for €1.0 bn. These financial allocations can be modified by MS throughout the implementation of their CAP Strategic Plans, depending on the uptake of these interventions and strategic choices.	The EU funds are allocated from the European Agricultural Fund for Rural Development (EAFRD) grant budget. The EAFRD funds are complemented with additional resources by each Member State or local authorities, which manages the total funding. The funding for investments is distributed via grants, but also through financial instruments (mostly loans and guarantees), or combination between the two.
European Maritime, Fisheries and Aquaculture Fund (EMFAF)	MARE	The European Maritime, Fisheries and Aquaculture Fund (EMFAF) mobilises €6.11 billion that provides support for fishers. The main funding is used to: support control and enforcement, monitoring, data collection and advice on fisheries, to help fishers transition to sustainable fishing including reducing their impact on sensitive species and ecosystems; to support coastal communities in diversifying their economies; to finance projects that create new jobs and improve quality of life along European coasts; to support sustainable aquaculture development and to support the implementation of the maritime policy.	The EMFAF funds are managed in a similar structure (shared management) as the EAFRD funds.
EU Cohesion Policy funds	REGIO	The European Regional Development Fund (ERDF) and the Cohesion Fund (CF), together with the European Social Fund (ESF) and the Just Transition Fund (which is part of the Just Transition Mechanism under the European Green Deal), form the EU Cohesion Policy funds. Taken together, these funds represent almost one third of the total Multiannual Financial Framework budget for 2021 – 2027 (€1.211 trillion – €1.074 trillion in 2018 prices), with ERDF being the biggest. Over the 2014-2020 period, almost EUR €7 billion ⁽¹⁷³⁾ of ESIF funds benefited enterprises in the agri-food sector.	Available to EU regions, allow to finance indirect partners, including academics, for their medium and long-term investments in innovation and industrial development. CF and ERDF are implemented through national and regional programmes implemented by the relevant nation and regional authorities in line with the shared management approach.
<i>ERDF European Regional Development Fund</i>	REGIO	The ERDF aims to strengthen economic, social and territorial cohesion in the EU by correcting imbalances between its regions. In 2021-2027 it will enable investments in a smarter, greener, more	Cohesion policy programmes are implemented in accordance with State aid rules.

⁽¹⁷³⁾ Non-official estimation.

		connected and more social Europe. Funds allocated are up to €226 billion .	
<i>Recovery and Resilience Facility (RRF)</i>	Member States / RECOVER	The centrepiece of NextGenerationEU is the Recovery and Resilience Facility - an instrument that offers grants and loans to support reforms and investments in the EU Member States for a total of €723.8 billion in current prices. Part of the funds – up to €338 billion – are spent via are being provided to Member States in the form of grants. Another part – up to €385.8 billion – are spent via loans to individual Member States. These loans will be repaid by those Member States. In the area of agriculture and agri-food it is estimated an investment of €6.7 Billion .	Funds under the RRF are being provided to Member States in line with their national Recovery and Resilience plans.
<i>Technical Support Instrument (TSI)</i>	REFORM	TSI is the EU programme that provides tailor-made technical expertise to EU Member States to mitigate the economic and social consequences of the outbreak of the COVID-19 crisis. The support is demand driven and does not require co-financing from Member States. TSI budget is €864 million for the period 2021-2027 (in current prices). Member States are not required to provide any co-financing. Various Member States have already used these funds to address the green and digital transition in the agri-food sector	The technical support is provided in a wide range of policy areas, including but not limited to climate action, digital transition and health. Member States can also request support to prepare, amend, implement and revise their national recovery and resilience plans under the Recovery and Resilience Facility
European Social Fund Plus (ESF+)	EMPL	ESF+ is the EU's main instrument for investing in people. With a budget of almost €99.3 billion for the period 2021-2027, the ESF+ will continue to provide an important contribution to the EU's employment, social, education and skills policies, including structural reforms in these areas.	
InvestEU	ECFIN	InvestEU provides an EU budgetary guarantee to the EIB Group (EIB and EIF) and selected implementing partners (IFIs, NPBs) with the aim to facilitate access to finance for riskier investments. It facilitates financing through 4 policy windows: 1. sustainable infrastructure; 2. research, innovation and digitalisation; 3. SMEs; 4. social investment and skills. The budgetary guarantee of €26.2 billion funded from NextGenerationEU resources and the EU Multiannual Financial Framework aims to mobilise more than €372 billion of public and private investment in the EU economy in the period 2021-2027.	InvestEU can support, amongst others, loans and equity investments in SMEs in order to improve their competitiveness, digitalisation, sustainability, innovation. Lending and equity investments are provided to companies by commercial banks, NPBIs, guarantee institutions, equity fund managers etc. Large proportion of these funds will be placed on the market by EIF/EIB.
Single Market Programme (SMP)	GROW / EISMEA	The SMP focuses on strengthening the governance of the single market and supporting the competitiveness of industry, in particular of micro, small and medium-sized enterprises. It has a budget of €4.2 billion for the period of 2021-2027 (€2 billion are allocated under the InvestEU Fund, in particular through its Small and Medium-sized Enterprises Window).	The SMP is based on projects such as the European Enterprise Network (EEN) or the ECCP (European Clusters Collaboration Platform), or specific calls. Some of this funding is allocated in Call for Tender or project structure.
Horizon Europe	RTD	Horizon Europe 2021-2027 is the EU's key funding programme for research and innovation. It must involve the research and innovation element. Horizon Europe has a budget of around €95.5 billion for 2021-2027 (in current prices).	

<i>Pillar 1 – European Research Council</i>	ERC	The ERC, set up by the European Union in 2007, is the premier European funding organisation for excellent frontier research. It funds creative researchers of any nationality and age, to run projects based across Europe. The ERC offers 4 main grant schemes: Starting Grants, Consolidator Grants, Advanced Grants and Synergy Grants.	Various grants up to EUR 10 million for 6 years for researchers
<i>Pillar 2 – Cluster 6 Food, Bioeconomy, Natural Resources, Agriculture and Environment - specific calls</i>	RTD, AGRI, ENV	The programme's Cluster 6 'Food, Bioeconomy, Natural Resources, Agriculture and Environment' has an overall budget of around €9 billion . Several actions throughout Cluster 6 are of relevance to the food industry. These are specially included in the Destination 2 'Fair, healthy and environment-friendly food systems from primary production to consumption' and Destination 'Resilient, inclusive, healthy and green rural, coastal and urban communities'. One third of this amount is dedicated to intervention area 3 (agriculture, forestry and rural areas).	Usually does not cover first industrial deployment phases (normally lower TRLs) Competitive calls for projects with strict schedule and evaluation process. Key principle of excellence. Mainly EU collaborative projects. As an example, the FOOD 2030 initiative and its pathways for action guide the food systems transformation.
<i>Pillar 2 - Cluster 6 - Food, Bioeconomy, Natural Resources, Agriculture and Environment - Partnerships</i>	RTD, AGRI, ENV	Several partnerships have been set up at European level in the context of Horizon Europe: 'Accelerating farming systems transition: agroecology living labs and research infrastructure', 'Animal Health and Welfare (PAHW)'; 'Agriculture of Data'; 'Rescuing biodiversity to safeguard life on Earth'; 'Climate neutral, sustainable and productive Blue Economy (SBEP)'; ' Sustainable Food Systems '; 'Circular bio-based Europe'. The latest is the single public-private partnership.	The partnerships can be co-funded (foundations, Universities and research centres), co-programmed (Public-private partnerships) or institutionalised (public-private partnerships and Member States). The Cluster 6 does not have so far co-programmed partnerships. Usually low-medium TRLs, setting their own competitive calls for projects with strict schedule and evaluation process. Replaced former ERA-Nets and JPIs.
<i>Pillar II – EU Mission: 'A Soil Deal for Europe'</i>	AGRI, RTD	The Mission Soil aims at establishing 100 living labs and lighthouses to lead the transition towards healthy soils by 2030. It also supports knowledge creation and solutions for soil health including the development of new technologies accelerating the green turn, promoting a more sustainable and resilient soil management including for agri-food production. Since 2021, three Mission Soil work programmes have been published, with a total budget of € 320 million . A work programme for 2024 is under development.	Usually does not cover first industrial deployment phases (normally lower TRLs) Competitive calls for projects with strict schedule and evaluation process. Key principle of excellence. Mainly EU collaborative projects.
<i>Pillar 3 – European Innovation Council</i>	EIC	The European Innovation Council (EIC) has been established under the EU Horizon Europe programme. It has a budget of €10.1 billion to support game changing innovations throughout the lifecycle from early-stage research to proof of concept, technology transfer, and the financing and scale up of start-ups and SMEs. It has 4 major funding schemes (below)	There are 2 types of calls: - Open: cover any type of innovative 'deep tech' technology, - and Challenge-focused: focusing on a particular technology (determined every year)
<i>EIC Pathfinder</i>	EIC	Early-stage technology research TRL 1-4	Grants < €4 million
<i>EIC Transition</i>	EIC	Technology validation and spin-out TRL 5-8	Grants < €2.5 million
<i>EIC accelerator</i>	EIC	Commercialisation and scale-up	Grants < €2.5 million Equity investments < €15 million

<i>EIC Fund</i>	EIC	The EIC Fund provides equity to breakthrough innovation companies selected for EIC Accelerator blended finance support (grant and equity) and through equity-only support	Equity investments from €0.5 million to €15 million
<i>Pilar 3- European Institute of Innovation and technology</i>	EIT	The European Institute of Innovation and Technology (EIT) is an EU body created by the European Union in 2008 to strengthen Europe's ability to innovate. The EIT is an integral part of Horizon Europe. The EIT has a budget of €3 billion for the period 2021-2027. This budget is topped up by partners of the partnerships.	Innovation Hubs can receive EIT's financial contribution which does not exceed 25% (on average) of an Innovation Community's overall resources. This funding can be topped up by further funding beyond their partners' own revenues and resources, such as private and/or public funding at national, regional and EU level, particularly the European Structural and Investment Funds and the Horizon 2020 programme.
<i>EIT Food</i>	EIT	One of nine EIT Hubs. Public-private partnership covering innovation, education and business in the agri-food area.	Co-financing for start-ups (through convertible bonds) and academic (grants) from indirect partners Thematic or tailor-made <i>EIT-Food</i> calls for projects of medium to high TRL levels.
LIFE (Programme for Environment and Climate Action)	ENV	The Programme for Environment and Climate Action, with a total budget of €5.43 billion (current prices) for the period 2021-2027, aims to facilitate the shift towards a sustainable, circular, energy-efficient, renewable energy-based, climate-neutral and resilient economy. The financial envelope of the LIFE Programme is implemented via four sub-programmes: Nature and Biodiversity Circular Economy and Quality of Life Climate Change Mitigation and Adaptation Clean Energy Transition	The programme supports demonstration, best practice, coordination and support actions, capacity building, and governance projects.
Digital Europe	CNECT	The Digital Europe Programme is designed to bridge the gap between digital technology research and market deployment, with a total budget of €7.59 billion (current prices). It provides finances for projects in 5 areas: 1. supercomputing; 2. artificial intelligence; 3. cybersecurity; 4. advanced digital skills (€580 M); 5. ensuring the wide use of digital technologies across the economy and society (€1.1 Billion).	Digital Europe supports several actions directly or indirectly targeting the agri-food sector, including the development of a Common European Agricultural Data Space, Testing and Experimentation Facilities for AI in agri-food, European Digital Innovation Hubs, of which a large share focus on agri-food, and support to advanced digital skills
ERASMUS+	EAC	Erasmus+ is the EU's programme to support education, training, youth and sport in Europe. It has an estimated budget of €26.2 billion . This is nearly double the funding compared to its predecessor programme (2014-2020). It supports priorities and activities set out in the European Education Area, Digital Education Action Plan and the European Skills Agenda.	The program can be used to support skills development in the agri-food ecosystem.

ANNEX 2: WORKSHOPS

1. Introduction to the stakeholder consultation process

For the development of the transition pathway for the agri-food ecosystem, a stakeholder consultation process was designed, involving a questionnaire as well as three (virtual) stakeholder workshops, on the following themes:

1. Uptake of digitalisation technologies for a resilient and sustainable agri-food industrial ecosystem;
2. Investments and funding in the agri-food industrial ecosystem;
3. New business models and support to SMEs for a resilient agri-food industrial ecosystem.

Using the questionnaire results as a starting point, leading questions were set up for each theme. These questions formed the basis of a digital whiteboard (in Mural) specifically formatted to guide the online discussions in each workshop. Each workshop roughly followed a process with three typical discussion rounds:

- Round 1: First exploration of the main workshop topic, creating a common ground among the stakeholders from diverse backgrounds;
- Round 2: A deeper exploration of the topic(s), gathering insights from the various stakeholder perspectives;
- Round 3: Action wrap-up.

The one notable exception to this general approach was Workshop 2: Investment and funding in the Agri-food industrial ecosystem. Specifically for this topic, there was a need to spend more time on Rounds 2 and 3. In this workshop, Round 1 discussions were replaced by a comprehensive overview of existing instruments and schemes.

Draft questions were formulated by the Commission's transition pathway working group (GROW F.3), and were subsequently discussed with key stakeholders within the Commission, as well as with the workshop facilitator. ⁽¹⁷⁴⁾ The revised questions were then shared with the workshop invitees. The exact phrasing of the questions is listed below in the summary of each of the workshops.

The Round 2 discussions in each workshop were linked to the results from the questionnaire. Initially, this link was realised by means of discussion prompts on the digital whiteboard. After Workshop 1, this set-up was modified in order to prevent repetition of insights already obtained from the questionnaires and ensure an even deeper exploration of the relevant topics. In Workshops 2 and 3, priority topics identified from the questionnaires were put up for priority voting, and the subsequent discussions were done on in parallel sub-groups each addressing one of the top-priority sub-topics. The selection of topics from the questionnaires, as well as the priority voting results are also listed below in the Workshop 2 and 3 summaries.

2. Summary of Workshop 1: Uptake of digitalisation technologies for a resilient and sustainable Agri-food industrial ecosystem

Workshop questions

The workshop was designed around the following five questions, addressed in three subsequent rounds:

Round 1: First Exploration

Q1: What benefits for people / planet / profit could digitalisation bring to the Agri-food industrial ecosystem?

Round 2: Deeper Exploration

Q2-1: What existing digitalisation solutions could help promote the sustainability and competitiveness of the Agri-food ecosystem?

Q2-2: What are the key factors for commercial uptake when implementing digitalisation solutions in the Agri-food industrial ecosystem?

Round 3: Action Wrap-Up

Q3-1: What actions are needed to stimulate R&I for digitalisation at national level? What are the gaps?

Q3-2: What actions are needed to stimulate R&I for digitalisation at EU level? What are the gaps?

⁽¹⁷⁴⁾ [Jan Vaessen facilitation](#)

Question 1: What benefits for people / planet / profit could digitalisation bring to the Agri-food industrial ecosystem?

Answers to this question have been categorised in three categories: people, planet and profit.

People

In the “people” category, the most frequently mentioned answers raised by stakeholders related to improved working conditions and social opportunities for workers. Robotisation is expected to create better health and safety standards, for example through a reduced exposure to pesticides, or through better safety monitoring in the workplace. Digitisation prepares the ecosystem for a future with a workforce decreased in size, but increased in skill level, creating higher job satisfaction and upward social mobility. For farmers, digitalisation offers efficiency benefits by means of lower input costs, increased resource efficiency (e.g. truck loading), better forecasting and less administrative burden. Another major “people” factor is related to increased transparency and traceability, and the corresponding labelling for consumers. This allows for higher levels of awareness and engagement of consumers, potentially nudging them towards more sustainable choices. Elsewhere in the Food system, improved traceability increases CSRD compliance, less waste and better tracing of animal products by means of DNA. It was noted though that the integration with AI needs additional policy and legislation. Food safety is another major “people” benefit: digitalisation can enhance natural preservation and – through more efficient resource management – fresher food products in general. A very specific safety-related aspect is better control of zoonotic disease spillover. Finally, digitalisation leads to improved forecasting, allowing more pro-active management of changes and crises in the food system, ensuring better access to food and the prevention of hunger.

Planet

The most frequently mentioned benefits in the “planet” category relate to automated systems and monitoring offering improved efficiencies in agricultural resources: energy, water and land, as well as a reduction of waste. Combined with reduced usage of fertiliser and pesticides, for instance in precision agriculture, the impact on loss of biodiversity is minimized. Another major factor mentioned is innovation, with plant-based alternatives to meat and dairy, as well proteins from marine sources reducing land use, or bio-based packaging to reduce waste.

Better planning is another important benefit area, with improved data-driven decision making, or shorter value chains tending towards regional self-sufficiency. Finally, improved circularity is mentioned, in particular upcycling of food production by-products.

Profit

Several cost benefits have already been mentioned in the previous categories: more efficient energy, water and land use, lower input costs and reduced fertiliser and pesticide usage. Innovation, too, delivers benefits, e.g. in refrigeration, or increasing process resilience through machine learning.

A major new factor in the “profit” category is better farm management through smart use of data, especially in coordination with other parties in the chain (suppliers, retailers). A key requirement for this is interoperability, fair access to data and agile forms of knowledge sharing, supported by appropriate digital platforms.

Question 2-1:

What existing digitalisation solutions could help promote the sustainability and competitiveness of the Agri-food ecosystem?

In this question, we used the top technologies identified in the questionnaire stakeholder consultation as a trigger. These were:

TOP TECHNOLOGIES (questionnaire)

Blockchain & Traceability

Precision / Smart Agriculture

Digital Monitoring Systems

Biotechnology & Bio-solutions

Waste reduction & Circular Valorisation

Renewable Energy & Decarbonisation
Plant- and Lab-based Alternatives
Chemical Recycling
IoT & Big Data
Automation & Robotics / UAVs
Artificial Intelligence (AI)
New Genomic Techniques

In the discussion groups, a wide range of digitalisation solutions was identified. When asked to summarise the priorities, the following selection was made by the group:

TOP TECHNOLOGIES (workshop)

Trusted data platform for sharing across the value chain
Interoperability of systems
Social tools for knowledge transfer
Standards on sustainability metrics
Robotics & Automation
Monitoring of working conditions
Circularity solutions
Web-enabled data carriers
Artificial Intelligence (AI)
Sensor Technology & Application
Precision Agriculture

Perhaps unsurprisingly, the priority list from the workshop shows a great degree of overlap with the priority list from the questionnaire-based consultation. However, based on the deeper discussion in the groups, it emerged that while ever more innovative hardware and software solutions are becoming available in the marketplace, the solutions for data management are lacking progress and support. These solutions are needed to provide trusted platforms for sharing between actors across the value chain and ensuring interoperability. This is a common theme relevant for a vast range of application areas in the Agri-food industrial ecosystem.

Question 2-2: What are the key factors for commercial uptake when implementing digitalisation solutions in the Agri-food industrial ecosystem?

From the group discussions, the following priorities have been identified:

MOST IMPORTANT SUCCESS FACTORS

Trusted data platform supporting sharing and development of AI
Harmonization and interoperability
Incentives for investment
Fit with circular business models
Advisory service support (particularly to SMEs)
High quality design (ease of use, inclusivity by design)
Education of technology operators across the sector
Improving modes of working for the workforce

Question 3-1:

What actions are needed to stimulate R&I for digitalisation at national level? What are the gaps?

A large number of potential actions emerged from the discussion. The following areas were selected by the participants as priority actions at national level:

- **Knowledge generation**
More financing for applied R&D (higher TRL levels), better knowledge on the ground, and increased knowledge on supply chain complexity*.
- **Knowledge dissemination**
Fostering knowledge transfer through outreach tools, demonstrators for solutions, and implementation policies.
- **Alignment**
Involving stakeholders across sectors (e.g. Science, SMEs), best practice sharing, and focus on social dialogue and a just transition for the work force in the various member states.
- **Infrastructure**
Particularly in rural areas.
- **Member State incentives**
Including fiscal measures.

*Focus is traditionally on production or consumer; less knowledge and interest on what goes on “in between”.

Question 3-2:

What actions are needed to stimulate R&I for digitalisation at EU level? What are the gaps?

The following priorities emerged for EU-level:

- **Policy coherence**
Strengthening the link between science and policy, avoiding diverging policies on cross-cutting issues, and integrating the digitalisation agenda with the EU Social Dialogue and the relevant skills agenda.
- **Regional focus**
Advancing regional Innovation Valleys for Bioeconomy and Food Systems (I3/ERDF & Horizon Europe), more strategic autonomy on digital solutions and data infrastructure, including funding of rural broadband.
- **Standards**
Open product identifiers and harmonised standards on interoperability as well as environmental labelling.
- **Knowledge integration**
Increasing knowledge on supply chain complexity (see also * above); creating more collaboration across communities (e.g. creating links between EIT Food and EIT digital).

3. Summary of Workshop 2: Investments and funding in the Agri-food industrial ecosystem

Workshop questions

The workshop was designed around the following five questions, in two discussion rounds. As explained above, Round 1 discussions were replaced by a presentation.

Round 1: First Exploration

Comprehensive presentation of existing funding schemes

Round 2: Deeper Exploration

- Q2-1: What are the main investment needs of the ecosystem? Which new investment needs have emerged in the Agri-food ecosystem to mitigate the effects of the current economic and geopolitical situation?
- Q2-2: What are the most relevant funding systems (in terms of impact) at EU and national / regional level for the Agri-food ecosystem? What actions are needed to make those schemes more accessible? And what can we learn from third countries (e.g. US)?
- Q2-3: Are there any systemic barriers specifically for the Agri-food ecosystem to access to funding or investments, both private and public? What actions could help overcome these barriers? And what can we learn from third countries (e.g. US)?

Round 3: Action Wrap-Up

Q2-1: What actions can the private sector take to make the Agri-food ecosystem particularly attractive for investors?

Q2-2: What information and advice on funding and investment opportunities are needed by stakeholders?

Question 2-1:

What are the main investment needs of the ecosystem? Which new investment needs have emerged in the Agri-food ecosystem to mitigate the effects of the current economic and geopolitical situation?

From the previous stakeholder consultation, the following answers had been identified:

TOP INVESTMENT NEEDS

Research, development & innovation

Renewable energy

Decarbonisation

Circularity, efficient recycling & waste management

Transport & logistics infrastructure

Crisis prevention & measures

Digital infrastructure & technology

Skills, training & education

Market development & consumer education

Sustainable agricultural practices (e.g. regenerative agriculture)

Diversification of supply chains & dependency reduction

Working & employment conditions

Modernisation of real estate/facilities

Before going to priority voting, the second sub-question needed to be answered first: which new investment needs have emerged in the Agri-food ecosystem to mitigate the effects of the current economic and geopolitical situation? Several new investment needs had been identified, out of which the following seven had been proposed for priority voting alongside the investment needs from the previous stakeholder consultation:

NEWLY EMERGED INVESTMENT NEEDS

Consumer education (to make more sustainable choices)

Existing innovative animal health & welfare solutions (OneHealth concept)

Resource efficiency (energy, water use reduction)

**Trade facilitation technology at border crossings
(in line with WTO trade facilitation agreement)**

Protein diversification / innovative plant-based protein solutions

Support to scale-up, accelerate and de-risk the transition to more sustainable Agri-food practices

Sustainable plant protection

The following investment needs received priority votes (number indicated between brackets); the asterisks* indicate selection for further elaboration. In order from highest to lowest priority:

PRIORITY INVESTMENT NEEDS

Sustainable agricultural practices (e.g. regenerative agriculture) (8)*

Resource efficiency (energy, water use reduction) (7)*

Digital infrastructure & technology (6)*

Circularity, efficient recycling & waste management (5)*

Diversification of supply chains & dependency reduction (5)

Renewable energy (5)
Research, development & innovation (5)
Decarbonisation (4)
Market development & consumer education (4)
Protein diversification / innovative plant-based protein solutions (4)
Skills, training & education (4)
Transport & logistics infrastructure (4)
Working & employment conditions (3)
Consumer education (to make more sustainable choices) (2)
Support to scale-up, accelerate and de-risk the transition to more sustainable Agri-food practices (2)
Sustainable plant protection (2)
Crisis prevention & measures (1)
Existing innovative animal health & welfare solutions (OneHealth concept) (1)

The top-four investment needs were elaborated in a further discussion round. The guiding question for this elaboration was: Where does the Investment Need come from, and why is it a priority?

Sustainable agricultural practices

In this area, there are two types of financing needs: support for farmers to produce more sustainably, and support for farmers to produce lower impact crops and products (such as plant-based proteins). The investment need exists because external benefits for human health and the environment are not properly considered. A Just Transformation Mechanism needs to be created for farmers. Existing financing programmes cannot compensate for the lack of the farmers' negotiation power. There is an urgent need to regulate that products cannot be sold below the production cost. Also, consumptions and end taxes need to be readdressed: equitable VAT to support sustainably produced plant-based products, rather than higher VAT. Specifically for plant-based proteins, more CAP funding is needed to make the more sustainable option cheaper and cover the risk taken by farmers.

Resource efficiency (energy, water use reduction)

The quality and quantity of water is key to food production. This item not only concerns primary production but is relevant along the entire food chain: there is potential for improvement in food processing, it is an important topic for capacity building with partners in the supply chain, and there is a growing interest from consumers. Improving resource efficiency has a high potential for direct benefits to people and ecosystems. Cost-benefit ratios are expected to be high, but there are still many uncertainties on new solutions, their outcomes remain unclear. One promising direction for solutions is to increase the rate of closed-loop recycling, which requires investment and infrastructure. Also, it was particularly noted that this is an important topic for upskilling.

Digital Infrastructure & Technology

Several areas of application were mentioned, most frequently in support for farmers to transition to more sustainable agriculture, through e.g. Integrated Pest Management, biocontrol or precision agriculture. It enables the development of new business models, and the optimisation of existing ones (e.g. through route optimisation and demand forecasting). Other benefits are found elsewhere in the food chain: better supply chain collaboration, and consumer education in relation to transparency and traceability. Advanced analytics can help better cost management and pricing, including measures that compensate societal and environmental challenges.

Circularity, Efficient Recycling & Waste Management

Reducing food waste is a number one priority in this area: not only because of the waste reduction itself, but also for the sake of food security, as the production rate is not following population growth. High-end valorisation of side streams is a promising innovation, particularly for the sake of alternative protein sources. Ultimately, this could result in a wider offering of sustainable food products and ingredients, but consumer interest in circularity may need to be developed.

Circularity is already working in certain sectors of the ecosystem, but innovative solutions are needed in other sectors. Such innovations, driven by R&D, could also new, “greener” business opportunities for farmers and other actors in the ecosystem.

Question 2-2: What are the most relevant funding systems (in terms of impact) at EU and national / regional level for the Agri-food ecosystem? What actions are needed to make those schemes more accessible? And what can we learn from third countries (e.g. US)?

Once more, this question started from key topics extracted from the questionnaire-based stakeholder consultation:

TOP FUNDING SCHEMES
Common Agricultural Policy (CAP)
Horizon Europe
Next Generation EU Funds
EU Structural and Investment Funds (ESIF)
Innovation Fund
Digital Europe Programme
European Maritime Fisheries and Aquaculture Fund (EMFAF)
Invest EU Fund
Important Project of Common European Interest (IPCEI)
SMP / COSME
Agri-food Promotion Policy
Cohesion Funds
Erasmus
Life – The EU Sustainability Funding Programme
National funding (e.g. IGF – Germany, LEADER – Ireland, ...)

Priority voting resulted in the following ranking (number of priority votes indicated between brackets) and selection for further elaboration (indicated by asterisks*):

PRIORITY FUNDING SCHEMES
Common Agricultural Policy (CAP) (17)*
Horizon Europe (12)*
Invest EU Fund (7)*
Next Generation EU Funds (7)*
National funding (e.g. IGF – Germany, LEADER – Ireland, ...) (5)
Innovation Fund (5)
EU Structural and Investment Funds (ESIF) (4)
Cohesion Funds (4)
Digital Europe Programme (3)
Agri-food Promotion Policy (3)
Life – The EU Sustainability Funding Programme (2)

Guiding question for further elaboration: What actions are needed to make this scheme more accessible? And what can we learn from third countries (e.g. US)?

Common Agricultural Policy (CAP)

The participants highlighted the importance of communication and promotion to support farmers accessing funds earmarked for sustainability. Specifically, the need for promotion materials and guides on how to apply and comply with the requirements was mentioned. Specific examples mentioned include instruments like Eco-Schemes, promotion Policy and Coupled Income. Training is another key factor for sustainable production, for example in IPM and non-chemical pest control. Depending on the topic, better connections to other schemes are needed, for instance to the European Maritime, Fisheries and Aquaculture Fund for a topic like Aquaponics.

Finally, it was mentioned that support needs to stretch down to the local level, more availability to answer questions and explaining the available opportunities. Local involvement of farmers will also help in establish the appropriate rules and measures.

Invest EU Fund

Capacity to evaluate loans and equity investments, as well as information provided by banks were mentioned as key bottlenecks. The evaluations need a holistic approach, and interoperability between Agri-food areas. It was suggested to channel the Invest EU Fund through national and regional banks and further information from national and regional authorities. Also, a remark was made to pay more attention to the size of consortiums funded, and stimulate more small interventions. From the point of view of users, a higher financial literacy and capacity to understand the different financing instruments that are available. Finally, a better identification of the key actors regarding agri-food instruments for financing in each country was also mentioned.

Next Generation EU Funds

A key discussion point here was a better alignment at national level: using national programmes focused on the Ecosystem, promote peer learning between member states, and use trusted partners (e.g. local associations) to help reach potential beneficiaries. Generic improvement suggestions include better communication on available funding, and reducing the administrative burden. A final remark concerns increased transparency of who is benefiting, and encouraging fair access.

Horizon Europe

A key bottleneck that was identified is the missing link between the results, the business operators and the policy makers. As far as knowledge transfer is concerned, this needs to more attention, including the targeted promotion of project outcomes. As to policies, a greater alignment with EU policy priorities and with HE projects / work programmes is needed. More synergies across clusters (moving beyond CL6) are called for, including more targeted partnerships (e.g. in protein diversification). The supply chain perspective needs to be strengthened, for example, a decentralised approach in food chain distribution would diminish outside dependency (i.e. systemic approach). Last but not least, according to stakeholders, Horizon Europe needs to be made (more) accessible to farmers and SMEs, facilitating the rules for private businesses.

Question 2-3: Are there any systemic barriers specifically for the Agri-food ecosystem to access to funding or investments, both private and public? What actions could help overcome these barriers? And what can we learn from third countries (e.g. US)?

The questionnaire-based stakeholder consultation yielded the following answers:

TOP BARRIERS

Limited resources & skills

High perceived risks by investors/funding bodies

Missing information on funding opportunities

Exclusion of agri-food sector from EU taxonomy

Strict requirements & burdensome application process

Strategic investment focus is not on agri-food

Low margins & limited capital

EU subsidies that jeopardise production or markets

High (initial) costs for new machinery & technologies

Short horizons and too high interest rates in financial instruments

Information asymmetry among players

Limited access to market information

As a result of priority voting, the ranking was identified (number of votes between brackets), with a selection of topics for deeper exploration (indicated by asterisks*):

PRIORITY BARRIERS

High perceived risks by investors/funding bodies (12)*

Limited resources & skills (10)*

Low margins & limited capital (9)*

Missing information on funding opportunities (8)*

Strategic investment focus is not on agri-food (8)

Strict requirements & burdensome application process (7)

High (initial) costs for new machinery & technologies (5)

Short horizons and too high interest rates in financial instruments (5)

Exclusion of agri-food sector from EU taxonomy (4)

Information asymmetry among players (2)

EU subsidies that jeopardise production or markets (1)

Limited access to market information (1)

Guiding questions for deeper exploration: What actions would overcome this barrier? And what can we learn from third countries (e.g. US)?

High perceived risks by investors/funding bodies

There has been a great variety of comments on this topic, both from the investor and investee angles, as well as on a more systemic level. From the investor perspective, de-risking is a major factor, which requires a clear vision of the policy and regulatory environment, as well as a better understanding of barriers and a pragmatic solution-based approach. Examples mentioned were the use of EAFRD instruments to cover part of the risk by funding institutions, and public loan guarantees, as exist in the US. Also, there might still be a mindset preventing investment in new technologies (IPM and Aquaponics were mentioned as specific examples), which could be addressed by means of targeted education. From the investee's perspective, clearer information and less complicated procedures are once more called for, as well as making instruments more accessible to SMEs. Another potential solution involves combining investment tools with grant support. At a systemic level, a key bottleneck is the proper economic valorisation of environmental aspects. Also, there is a need for capacity building in funding bodies to better understand the needs of the sector.

Limited resources & skills

A big need identified here was the call for more transparency on procedure and conditions, simplification of information and procedures. It was noted that national networks for guidance around funding, financing and investment would be very beneficial. Staff of the funding programmes need "adopted to reality" support. Another major factor was collaboration: stimulating farmers to get together, helping each other, share knowledge and skills, building communities representing the entire value chain. Apart from skills benefits, such collaboration could potentially drive down capital costs for machinery.

Low margins & limited capital

Apart from generic solutions also proposed elsewhere (simplification, and clearer information), a major specific factor here was related to pricing policies, finding a proper balance between responsibilities to invest and affordability of food. Tools may be needed to protect against market disturbances, protecting commodity prices. In campaign-based sectors, bespoke financing solutions may be needed. Matchmaking and interoperability may need to be stimulated. Funding schemes should address differentiated target groups (e.g. small and big farmers); the use of target personas could be helpful.

Missing information on funding opportunities

Already identified as part of other priority topics, this topic was also address specifically. Key information gaps were identified: finding specific information on terms of various tools, as well as the steps for application and the likelihood of success. In terms of solutions, there was a call for farmer advisory services to be organised. Reaching out to employer associations or trade unions could help to build the bridge. In addition it was highlighted the need for a better dissemination of information at national and regional level to reach smaller actors in the chain.

Question 3-1: What actions can the private sector take to make the Agri-food ecosystem particularly attractive for investors?

Several potential actions have been identified in a brainstorm, the following priorities were established by means of priority voting (number of votes indicated between brackets):

PRIORITY ACTIONS

Create new and exponentiate existing collaborative pathways between different sectors (14)

Communication and education about beneficial impacts of Agri-food industry (12)

Communication on successful initiatives relating to sustainable agriculture, and what are the key factors that enable the transition (12)

Develop digital tools to help (SMEs) collect financial data to help them make a business case for investment (10)

Generate a dialogue instead of polarisation, ensure coherence and predictability (9)

Sustainable and innovative bio-based products (8)

The search for truly transformative solutions in view of the need to feed an ever-increasing human population (3)

To promote a “real” technology / knowledge transference (research to market) (3)

Question 3-2: What information and advice on funding and investment opportunities are needed by stakeholders?

After brainstorming, the following priorities were identified (priority votes indicated between brackets):

PRIORITY INFORMATION & ADVICE

“One Stop Shop” to know about various initiatives (14)

Clarification of what is considered a sustainable economic investment for the Agri & Food sectors, under the taxonomy (11)

Predictability and stability of the legislative framework (10)

Agri-food SME investor readiness training (9)

Sector-specific advice or advisory service (7)

Market analysis, financial projections and risk analysis (6)

Reduce complexity (5)

Regional governance for implementation of training / information (3)

Info and support from bigger players in the value chain to their subcontractors (3)

Awareness of investors key priorities and valuing aspect (2)

Networks and collaboration (2)

4. Summary of Workshop 3: New business models and support to SMEs for a resilient Agri-food industrial ecosystem

Workshop questions

The workshop was along the following questions in three rounds:

Round 1: First Exploration

Q1-1: What are the strengths, challenges, opportunities and threats of/to SMEs in the Agri-food industrial ecosystem? (SWOT-analysis)

Round 2: Deeper Exploration

Q2-1: What are the support needs of SMEs (e.g. business support organisations? collaboration with peers? support from big companies?)

Q2-2: What are the most promising and scalable technologies for the Agri-food ecosystem in which investment would be profitable for SMEs?

Round 3: Action Wrap-Up

Q3: What can be done to support SMEs to be more competitive and sustainable beyond available support options?

Question 1-1: What are the strengths, challenges, opportunities and threats of/to SMEs in the Agri-food industrial ecosystem?

A SWOT analysis was conducted in break-out discussion groups and captured on a digital (Mural) whiteboard:

<p>Strengths</p> <ul style="list-style-type: none"> • Innovation • More capacity to develop knowledge compared to corporates • SMEs will have place-based innovations • Agility and flexibility • Adaptability to consumers' demands; change of consumption trends • Easier to overview and monitor circular resource flows • Local integration • Local knowledge and connections • Important employer in rural areas • SMEs can have stronger connections to local communities – local focus – production of specialized products • Access to productive resources, services and markets • Closer and personalised customer service 	<p>Challenges</p> <ul style="list-style-type: none"> • Lack of investments to start • ESG criteria might take longer to implement due to cost • Systemic barriers to access funding • Less access to capital resources compared to larger companies • SMEs face challenges accessing sustainable financing opportunities • It can be difficult to both find and use the opportunities that EU funding offers • Low / less financial resources – barrier for investment in new technologies and innovation • Unpredictable agro-ecological risks • Lack of suitable training, extension and advisory services • Regulatory / administrative burden: authorization of biocontrol products (IUCLID dossier system generating costs, delays and complexity of the authorisation process) • Administrative burden: reporting obligations for green transition measures • Difficulties with permits (lengthy / complex procedures) • Proportionally heavier regulatory compliance • Lack of scale and efficiency • Hard to scale up • Continuity of funding across TRLs • Lack of harmonised standards in the EU • Knowledge gaps (tech, financial, collaboration) • Shortage of skilled workers • More coordination between local food agencies to harmonise protocols • Power imbalance vs. their customers (retail) • Mentoring support • Broader market access and distribution
<p>Opportunities</p> <ul style="list-style-type: none"> • Market space to new food production technologies to attend the population demand • Uniqueness as a connection to a strong place-brand, traceability, perceived added 	<p>Threats</p> <ul style="list-style-type: none"> • Less resources to develop a patent • Less leverage in price negotiations with retailers • Policy barriers

<p>value connected to hand-crafted or small-scale productions, which associates to resilience and sustainability</p> <ul style="list-style-type: none"> • Strong and competitive single EU market • Quick adaptability • Connected to sustainable “markers” that compensate societal or environmental challenges as farmed with regenerative methods, sustainable fisheries, young farmers, or strong CSR markers • Being flexible sometimes requires a mix between automation and manual handling – it can be challenging to change production flows or distribution of big volumes if these are only digitally-driven • Easier to overview and monitor circular resource flows • New markets for positive env. externalities (carbon capture, etc.) • New business models by “greening” / environmental improvements • Sustainability: SMEs can adapt to local conditions • Cooperation can address challenges SMEs face when dealing with larger business partners (negotiation power) • More coordination between local food agencies to harmonize protocols • Disruptive technology adoption = leapfrogging • Direct-to-Consumer models • Sustainable and non-traditional niches • Cross-sectoral collaboration beyond the traditional agri-food purpose • Unused potential in agri-food in Central Europe • New business models through digital channels / technology 	<ul style="list-style-type: none"> • Evolving regulations • Fragmentation of the single market • Slow adjustment to climate change • Non-holistic review of the supply chain, but focus on producers and consumers • Local competition • Lack of evolution in regulation • External production factor costs – fertilisers, energy, pesticides • Disruption • Traditional sector with little appetite for change • Lack of access to finance and education • Systemic disruptions • Competition from larger companies • Vulnerability to market fluctuations • Global supply chain disruptions • Burdens from sustainable finance regulation (CSRD, CS3D, etc.)
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Question 2-1: What are the support needs of SMEs (e.g. business support organisations; collaboration with peers; support from big companies)? How could the support to agri-food SMEs through existing business support organisations and networks be improved?

From the previous stakeholder consultation, the following support needs had been identified:

TOP SUPPORT NEEDS

Less bureaucracy and administrative burden

Skill / capacity building programmes

Access to guidance & advisory services

Better measures / methodologies in agri-food (e.g. KPIs, LCAs, ...)

Longer transition periods to reach sustainability targets

Improve access to financial support

Protection from unfair trading practices

Encourage collaboration along the supply chain

Facilitate international market access

Educate consumers about sustainability contribution & importance of SMEs
Lower taxes & more fiscal incentives
Enhance accessibility to new technology / machinery
Reward development & uptake of innovative business models / technology

Priority voting resulted in the following ranking (number of priority votes indicated between brackets) and selection for further elaboration (indicated by asterisks*):

PRIORITY SUPPORT NEEDS

Less bureaucracy and administrative burden (11)*
Improve access to financial support (11)*
Encourage collaboration along the supply chain (7)*
Access to guidance & advisory services (6)*
Protection from unfair trading practices (5)
Skill / capacity building programmes (4)
Enhance accessibility to new technology / machinery (4)
Better measures / methodologies in agri-food (e.g. KPIs, LCAs, ...) (3)
Facilitate international market access (2)
Educate consumers about sustainability contribution & importance of SMEs (2)
Lower taxes & more fiscal incentives (2)
Reward development & uptake of innovative business models / technology (2)
Longer transition periods to reach sustainability targets (1)

The top-four investment needs were elaborated in a further discussion round. The guiding question for this elaboration was: How could the support to agri-food SMEs through existing business support organisations and networks be improved?

Less bureaucracy & administrative burden

A key conclusion of the discussion is that guidance and assistance is needed to navigate government programmes and incentives. One important suggestion is the “One Stop Shop”: service centres that provide comprehensive support, including regulatory information and requirements. This reduces the need for SMEs to interact with multiple agencies, cutting down on administrative complexities. Digitalisation has proven useful to automate and simplify SME processes, as seen in Slovenia, for instance. Digitalisation would require consistency in digital solutions, e.g. CAP using geo-tagged photos only once, as well as reduction of the number of databases through centralisation.

There is also a call to empower and develop sector-systemic approaches. For example, in relation to renewable energy, simplify the process for permits and access to the grid. The VC operated model may be preferable vs. large consortium-driven projects. Also, it may be useful to focus on facilitating small projects first, that can subsequently introduce mainstream effects. Guidelines, practical examples and success stories will help.

Improve access to financial support

A number of ideas were generated to bring financing and SME actors closer together:

- Define target personas and adequate procedures
- Key metrics reference for the sector
- Investor training (specific functioning of EU Agri-food ecosystem)
- Condensed information workshops from the Commission
- Information and advisory services available in multiple languages
- Coordination of financial instruments
- Wider and stronger supporting and advisory services
- Centralised information source (one-stop shop)

Encourage collaboration along the supply chain

The basic idea is to create and share value through collaboration. This could be done by establishing a platform (and/or use a Code of Conduct) to share best practices and provide matchmaking opportunities. In order to create more trust in each others' operations, such platform would need to be supported by:

- Real-time communication technology
- Collaborative planning solutions
- Organizational governance (contracts)
- Promoting awareness among policy makers
- Incentives to promote the cooperative business models (legislation, taxation, capacity building)

And example of an area where the collaborative approach could work is biocontrol, where networks of SMEs and farmers can identify issues and search for solutions.

Access to guidance & advisory services

In the discussion, difficulties in finding the added value, and difficulties to reach the whole ecosystem were identified as key challenges to be overcome. The following solutions were identified:

- Easier access to banks or information on financial tools
- Access to professional organisations
- Economic development at local scale, with a clear role for local associations working with local authorities
- Capacity building (business skills, finance literacy, digital skills)
- Projects and living labs as a tool to enhance SME engagement
- Enhanced co-operation between different sectors in the value chain, e.g. food and tourism
- Strategic communication campaigns that help overcome the human challenges of change

Question 2-2: What are the most promising and scalable technologies for the Agri-food ecosystem in which investment would be profitable for SMEs?

From the previous stakeholder consultation, the following technologies had been identified:

TOP PROMISING/SCALABLE TECHNOLOGIES

Automation and Robotics / UAVs

Digital platforms & communication

Blockchain & Traceability

Artificial Intelligence (AI)

Digital Monitoring Systems

Renewable Energy

Waste Reduction & Circular Valorisation

New Genomic Techniques

IoT & Big Data

Packaging Solutions

Plant- & Lab-based Alternatives

Vertical Farming

Priority voting resulted in the following ranking (number of priority votes indicated between brackets) and selection for further elaboration (indicated by asterisks*):

PRIORITY PROMISING/SCALABLE TECHNOLOGIES

Renewable Energy (9)*

Digital Monitoring Systems (7)*

Digital platforms & communication (6)*

Waste Reduction & Circular Valorisation (6)*

Blockchain & Traceability (5)

Artificial Intelligence (AI) (4)

Packaging Solutions (4)

Plant- & Lab-based Alternatives (4)

Automation and Robotics / UAVs (3)

Vertical Farming(3)

The top-four investment needs were elaborated in a further discussion round. The guiding question for this elaboration was: How could the uptake of these technologies be supported?

Renewable Energy

A key comment here was the integration of agri-food and energy supply chains. Circularity may involve energy carriers such as biogas and hydrogen. Agro-solar systems are another example. In general, there is one circular value system covering production streams, waste streams and energy.

As to the role of the European institutions, several functions were mentioned:

- Providing information / knowledge to SMEs and farmers
- Matchmaking, e.g. between business that can use heat pumps and technology providers.
- Stimulate engagement of SMEs in R&D
- Long term investments, e.g. in green hydrogen
- CAP providing financial tools for renewable energy
- Facilitating the challenge of access to permits

There are other actors playing key roles: national bodies (for example in the decarbonisation plans in France – supporting the 50 biggest factories to reduce carbon emissions) and the private sector (a dairy cooperative is paying farmers 5% more if they use renewable energy and/or use methods that strengthen biodiversity).

Digital monitoring systems

Several technology examples were discussed:

- Technologies for real-time performance management / AI led optimization through analytics (for agri-food traders in specific) optimizing trade flows, energy efficiency, transport ways, sourcing, etc.
- Sensors for monitoring temperature and humidity - longer shelf life of products, less waste, prevention of food contamination
- Monitoring systems (climatic and field conditions, early warning on pest and diseases) allow to have an optimized use of biocontrol plant protection products
- Connection between monitoring systems and decision making systems in agriculture
- Digitalisation of food processing

Digital Platforms & Communication

With a proper level of ICT sector capacitation, digital platforms & communication can support SMEs in a great number of areas:

- Sharing best practices
- Support decision making along the value chain
- Tracking energy consumption data
- Connecting with consumers
- Full value chain traceability
- Communication of environmental footprint (potential link with TCA)
- Guidelines and advice from business organizations
- Represent important data banks worth to be explored for enhancing business models or create define new ones

Waste Reduction & Circular Valorisation

Farms can play a major role in circular production and energy self-sufficiency. A number of challenges need to be overcome:

- Reduce planning barriers for small-scale energy initiatives
- Make it viable to deliver surplus energy (solar energy to the grid; biomass and biogas distribution)
- Analyse the economic aspects of investments, and introduce effective subsidy schemes

- Stimulate a market for circular products
- Sort out tensions between EU ambitions and member state / local implementation

Particular examples mentioned include:

- Bio-based fertilisers
- Solar panels adapted to greenhouses and aquaponics systems
- Geothermal technology for greenhouses

Question 3: What can be done to support SMEs to be more competitive and sustainable beyond available support options?

Several potential actions have been identified in a brainstorm, and the following priorities were established by means of priority voting (number of votes indicated between brackets):

PRIORITY ACTIONS
Collaboration across supply chain - better access to the market (6)
More advertisement on existing funding schemes (5)
Policy support - addressing regulatory barriers, certification processes, etc. (5)
Alleviate regulatory burden for SMEs
Allow for long-term business planning and investments (proportionate legislation) (4)
Special support of small producers and promote the generational renewal (4)
Tax incentives (4)
Financial literacy training for SMEs to help make business case to access finance (3)
Assessments of impact of existing legislation (direct or indirect) on SMEs can encourage better drafting of new regulations (3)
Value positive environmental externalities (3)
More transparency and access to buyers/markets (3)
Follow up on SME relief package (2)
Provide regulatory sandboxes for businesses to test collaboration (1)
Lower the innovation threshold (0)