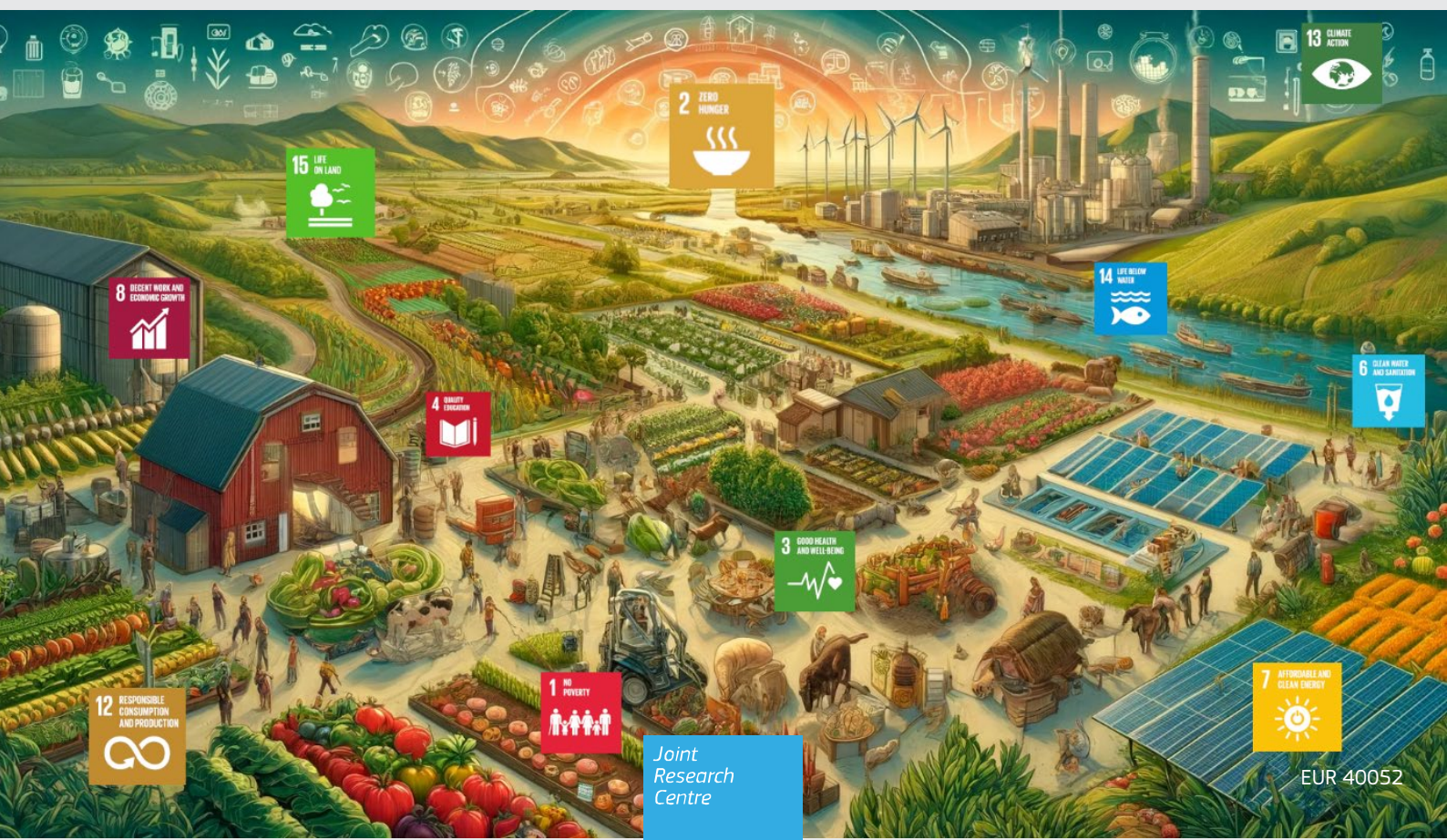




Cultivating sustainability: the role of European Food Systems in advancing the SDGs

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Guerrieri V, Acs S, Buscaglia D, Maroni M, Marelli L.

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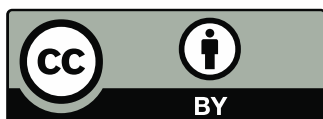
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Abstract

EU food systems resemble complex webs of relationships spanning supply chains, consumption patterns, ecosystems, human health, and planetary boundaries and demanding systemic approaches for fostering a transition towards more sustainable outcomes. The Farm to Fork Strategy outlines a vision for such a transition to align healthy societies with a healthy planet, presenting an integrated pathway for advancing the Sustainable Development Goals (SDGs). However, the complexity emerging from the interactions inside those systems hamper a clear understanding of what should constitute sustainable EU food systems and which SDGs are addressed by them. This report identifies key sustainability elements in food system conceptualizations, including environmental, economic, social, and governance aspects. These elements are then linked to the SDGs to demonstrate how sustainable food systems can advance them in an integrated manner. The current state of progress on food system-related SDGs is discussed, highlighting challenges and opportunities. The report further contextualises relevant SDG interlinkages to shed light on the dynamic interactions that drive system behaviour. Findings highlight food systems' potential to address multiple SDGs directly (notably SDG 2, 3, 6, 8, 12, 13, 14, 15, and 17) and the entire 2030 Agenda through SDG interlinkages. This report details the complexities, challenges, and pathways towards achieving a sustainable, inclusive, and resilient food system aligned with the 2030 Agenda for Sustainable Development.

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1 Introduction

The food system encompasses a complex web of relationships spanning supply chains, consumption patterns, ecosystems, human health, and the safe operating space of our planet (Rockström et al., 2020). To achieve a sustainable food system, we must shift our perspective, recognizing the deep interconnections between these elements, dimensions, and related policies (Barbero Vignola et al., 2024).

The European Commission's Farm to Fork Strategy or F2F (European Commission, 2020), adopted in May 2020, directly targets the challenges of sustainable food systems. Recognizing the intrinsic link between healthy people, societies, and a healthy planet, this strategy lies at the heart of the Commission's European Green Deal and plays a pivotal role in achieving the United Nations' Sustainable Development Goals (SDGs). The F2F emphasizes a systems approach. It charts a path by integrating diverse sectoral policies influencing food production, processing, distribution, and consumption, thus prioritizing the transition to sustainability.

Understanding sustainable food system elements, their **relationship to the SDGs**, and the scope of **current sustainability initiatives is key** to grasping the intricate connections within the system. This understanding will allow us to **leverage these elements** to drive a **sustainability transition** and advance broader sustainability frameworks like the 2030 Agenda.

This report seeks to **define the key components of a sustainable EU food system and shed light on SDG progress**. Analysis is based on extensive literature reviews and desk research, expert advice as well as developed tools to explore interlinkages and trade-offs amongst the elements considered. The report is structured as follows. Chapter 2 reviews sustainable food system definitions, highlighting the critical elements to be integrated within a sustainable Union approach. Chapter 3 explores the links between the SDGs and the EU food system, assesses progress on relevant SDGs, and offers insights on the identified SDG interlinkages – underscoring the European food system's systemic nature through an integrated SDG lens.

2 Key elements for an EU sustainable food system

Achieving a sustainable food system within the EU requires a two-fold foundation: a clear understanding of the food system's components and a clear sustainability framework tailored to this context.

In this chapter, we will examine and compare the conceptualizations of food systems developed by three influential global and European expert groups: the United Nations Food Systems Summit (UNFSS) Scientific Group, the High-Level Panel of Experts on Food Security and Nutrition (HLPE), and the Science Advice for Policy by European Academies (SAPEA). This comparison will highlight the core components of food systems as well as the key aspects of the sustainability transition. By identifying areas of agreement and potential gaps, we then propose essential sustainability elements specific to the EU food system.

Starting from the United Nations Food Systems Summit (UNFSS) of September 2021 and building on the work of the FAO (FAO, 2018, 2019), the **UNFSS Scientific Group** defines food systems as encompassing all actors and activities involved in the "production, aggregation, processing, distribution, consumption, and disposal (loss and waste) of food products." These products originate from diverse sectors, including agriculture, forestry, fisheries, and food industries. Importantly, food systems are embedded within broader economic, societal, and natural environments (United Nations, 2021). They are interconnected with systems like health, science, the economy, and ecosystems. These systems operate at multiple scales, are sensitive to local contexts, and are vulnerable to external forces such as climate change, economic disruptions, armed conflicts, and pandemics.

This definition of UNFSS closely resembles the one of the **High-Level Panel of Experts on Food Security and Nutrition** (HLPE, 2020), the science-policy interface of the UN Committee on World Food Security (CFS). The HLPE also conceptualizes food systems as a set of continuously interacting elements, including the food supply chain, food consumption and diets and the ecological, human, economic, energy and health systems supporting food production. The food system has nutrition, health, and ecological, economic, and social impacts, at the same time being affected by biophysical, technological and scientific, political, economic, socio-cultural, and demographic drivers of change, as well as food governance and its actors.

Food systems are always changing and evolving (United Nations, 2021). Hence, a **transition toward sustainability** depends on the policies, institutions and innovations applied as they affect the various food system actors and the dynamics of their relationships. For the UNFSS, a sustainable food system contributes to food security and nutrition for all, while safeguarding future generations and the ecological, economic, social, and cultural bases underpinning the system, in light of the UN Agenda 2030. The key components are thus food security and nutrition for all supported by a shift toward sustainable consumption patterns (e.g., healthy and sustainable diets) and nature-positive production (e.g., reducing emissions and energy usage), ensuring equitable livelihoods and value distribution and resilience to shocks. Relevant cross-cutting themes include, amongst the others, the impact of Covid-19, the role of science, gender equality, trade and finance, the inclusion and active participation of younger generations, the elderly, indigenous and marginalized communities in shaping food system outcomes. These many elements require a holistic approach, as their pursuit in isolation would neglect systemic effects. The final objectives regard ending hunger and achieving healthy diets for all while protecting ecosystems and using biodiversity and natural resources sustainably and eliminating poverty.

The High-Level Panel of Experts on Food Security and Nutrition (HLPE) similarly centres its definition of sustainable food systems on food security. For the HLPE, these systems must be: productive (ensuring food availability), equitable and inclusive (supporting accessibility), empowering and respectful (granting agency to stakeholders), resilient to shocks, regenerative, healthy, and nutritious. The HLPE, like the UNFSS, underscores interconnectedness and calls for a cohesive framework to achieve the 2030 Agenda. It emphasizes system-wide thinking, broad stakeholder participation, focus on inequalities (gender, income, resource access), and solutions tailored to diverse contexts, including both technology and indigenous knowledge.

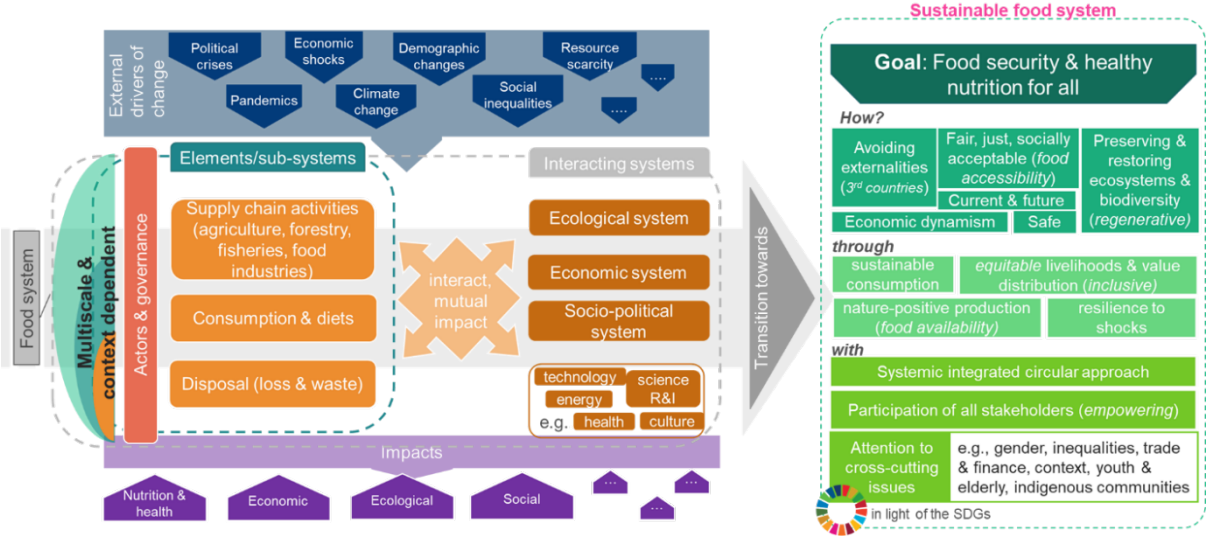
At the EU level, the **Science Advice for Policy by European Academies** (SAPEA, 2020, 2023) embraces a long-term vision of sustainability, aiming to provide safe, nutritious, and healthy food for generations within the EU. This must align with conserving ecosystems, achieving social acceptability and inclusion, and promoting economic dynamism. SAPEA stresses that this food security cannot come at the social and environmental cost of regions outside the EU.

Thus, objectives and outcomes of sustainable food systems should prioritize just, fair, and environmentally conscious food security, addressing both intergenerational and geographical impacts. Food provision must be robust and resilient within a challenging global context marked by environmental degradation, climate change, biodiversity loss, resource scarcity, price instability, and social imbalances. Finally, SAPEA champions a circular approach to the EU food system, recognizing its complexity, adaptability, and the need for its subsystems to also embrace sustainability.

While SAPEA's definition, understandably focused on the EU context, it does not explicitly address gender inequalities, the role of science and technology, or a direct link to the SDGs, it remains largely consistent with the UNFSS and HLPE. All three definitions converge on the core elements, impacts, and drivers within a food system, and their vision of sustainability encompasses intergenerational food security, ecosystem preservation, social acceptability, economic viability, resilience, and the need for systemic approaches and inclusive governance.

The **complexity of food systems** is illustrated in Figure 1 below, which attempts to provide a general overview of the characteristics of food systems and their transition towards sustainability, by combining the UNFSS, HLPE and SAPEA conceptual frameworks. The different components of the food system as identified by the three experts' groups are presented in the left side of the figure, which considers the multiscale nature and context-dependency of the food system; its core elements, or subsystems (in orange) can be summarised into food production, consumption, and disposal. These subsystems interact with adjacent systems (in brown), which also contribute to the food system, spanning from the ecological, economic, and socio-political systems to research and development, technology. Food system actors and governance play a relevant decision-making role inside the system, which is also shaped by external driving forces (in blue). As a result, the food system gives rise to multiple, interlinked impacts (in purple).

Figure 1. A representation of food system elements, interacting systems, drivers of change and impacts and the characteristics entailing sustainable food systems.



Source: Authors' elaboration based on the UNFSS, HLPE and SAPEA conceptualisations

The right side of the figure illustrates the transition towards a sustainable food system. Building on the insights of the three expert groups, the overarching goal of this transformation is to achieve food security and healthy nutrition for all (dark green). This must be done in a way that safeguards the needs of both future generations and people in other countries by preserving ecosystems and biodiversity both within and beyond the EU.

To achieve this, the sustainable food system must be regenerative, socially just, and widely accepted. It should provide adequate, accessible, safe, economically viable, and nutritious food. Key enablers of these characteristics include: nature-positive and efficient practices, sustainable consumption, healthy diets, equitable and inclusive value chains, and overall resilience to external shocks (the "through").

Only an integrated, circular approach, combined with governance that empowers all stakeholders, can weave these essential elements together. This approach must also prioritize cross-cutting issues like gender, inequality, trade, and finance (the "with"). The sustainable food system and the SDGs are deeply interconnected. The system itself is vital for achieving the SDGs, while the progress towards the 2030 Agenda will, in turn, support food system sustainability.

The key outcomes of these international discussions feed into the knowledge base needed for defining the sustainability elements, principles, and requirements of a sustainable food system. These insights are fundamental for addressing the sustainability of the EU food system. To this purpose, in 2021 the JRC collected reflections from a broad international group of experts with in-depth knowledge of different aspects of the EU food system – also using the SAPEA definition outline above and identified the general elements that characterise a sustainability assessment framework (Bock et al., 2022). A synthesis of all these discussions is presented in Table 1 below, which proposes a set of **main sustainability elements related to a EU sustainable food system, grouped by the environmental, economic and social (including health)-related food system dimensions.**

Table 1. Sustainability elements for an EU sustainable food system

Element	Description
Environmental	
ENV 1	Sustainable use, management – land, sea, soil, water, minerals, forests, air
ENV 2	Biodiversity conservation and restoration of natural resources and ecosystem services
ENV 3	Climate change adaptation & mitigation, GHG emissions
ENV 4	Reduction of other emissions, pollution (reactive nitrogen, pesticides, fertilisers, particulate matter)
ENV 5	Food loss and waste reduction
Economic	
ECON 1	Fair distribution of added value along food value chain
ECON 2	Equitable access to capital, technology, land, vessels, and markets
ECON 3	Economic viability of businesses respecting sustainability criteria
ECON 4	Transparency and accountability across the food value chain, responsible business and marketing
ECON 5	Sustainable and fair trade (rules for food imports and exports other than food safety)
Social (including health)	
SOC 1	Fair employment & working conditions in food value chain
SOC 2	Consumer food education and literacy
SOC 3	Food marketing and information to consumers
SOC 4	Affordability of healthy diets from sustainable food systems
SOC 5	Nutrient adequacy/healthy diets (EU, global)
SOC 6	Use of antimicrobials in primary production
SOC 7	Food safety
SOC 8	Animal welfare

Source: Authors' elaboration.

3 The Sustainable Development Goals (SDGs) in the EU Food System

Operationalising the implementation of the 2030 Agenda requires integrated perspectives towards the SDGs that account for the Agenda's indivisibility to effectively advance multiple sustainable development objectives systemically. Existing studies (TWI2050, 2018; Sachs et al., 2019; Dixon-Declève et al., 2023) outline through different concepts, like the transformational pathways or the major turnarounds, how such an integrated food system perspective can be applied. Although a sustainable food system pathway does provide an integrated approach towards advancing the SDGs, the various SDGs are differently affected by the food system. This chapter will explore those connections and identify the most relevant SDGs linked to a sustainable food system.

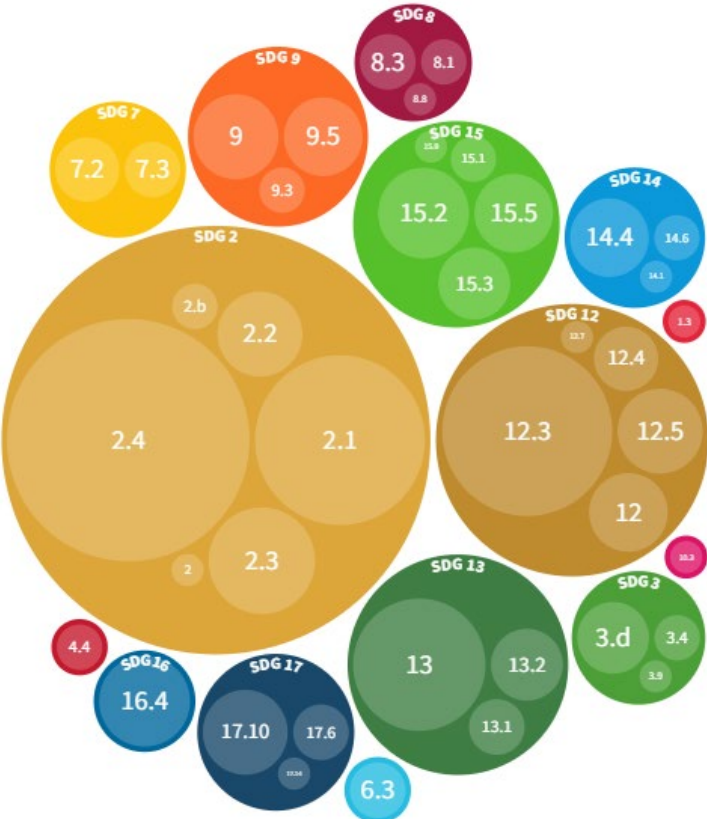
3.1 SDGs and the Farm to Fork strategy

As we have introduced, transitioning to a sustainable food system directly supports progress towards the 2030 Agenda. The Farm to Fork Strategy (F2F) outlines actions targeting fair, healthy, and environmentally conscious food production, processing, sustainable consumption patterns, and the reduction of food loss and waste. Aligning the F2F with the SDGs is thus crucial.

To pinpoint the most relevant goals and targets, we analysed the F2F strategy in collaboration with experts across various Commission services. This process was enriched by additional research on sustainable food systems, drawing from scientific articles, reports, and key policy documents. Utilizing text mining techniques and a keyword-based approach by capitalising on the SDG Mapper tool (Borchardt et al., 2020, 2022), the F2F Strategy was semantically screened and examined for relevant SDGs and specific SDG targets. As Figure 2 demonstrates, there is a strong connection between the F2F and the UN 2030 Agenda. Most keywords detected are connected to SDG2 (food security and sustainable agriculture), followed by SDG12 (sustainable consumption and production), SDG13 (climate action), and SDG15 (conservation and sustainable use of terrestrial ecosystems).

Our analysis also highlights specific SDG targets addressed within the F2F. These primarily fall under SDG2, notably targets related to sustainable production systems (2.4), food security (2.1), nutritious food (2.2), and agricultural productivity/incomes for producers (2.3). SDG12's target 12.3 on food waste reduction is also prominently addressed. In Figure 2, bubble sizes reflect the frequency of keywords associated with each goal and target.

Figure 2. SDG map of the Farm to Fork Strategy, number of keywords detected by goal and target



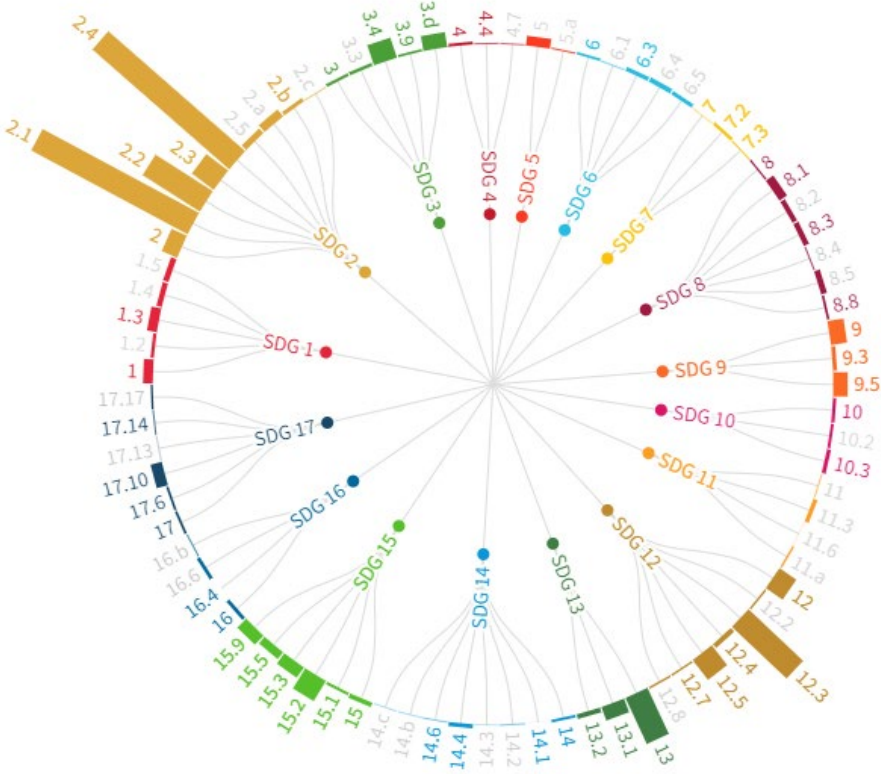
Source: Authors' elaboration based on *SDG Mapper*.

Note: the size of the bubbles is proportional to the number of keywords detected for each goal and target. The big bubbles represent the SDG while the smallest bubbles inside represent the targets. Detected keywords relating to the goal-level are captured by internal bubbles that have SDG number only (e.g. 13).

3.2 SDGs in sustainable food systems worldwide

The second step of the analysis went beyond the text of the F2F strategy and considered additional relevant documents available in literature (articles, reports, policy documents etc.) that specifically referred to sustainable food systems (see the full list in Annex 1). This detailed and enlarged literature review, conducted in 2022, allowed to identify a consistently larger set of SDGs and targets related to the food system. Figure 3 below shows this larger set of targets, distinguishing the ones already identified in the F2F strategy (in colour) and the additional ones identified by the literature review (in grey). All the results were further checked and contextualized by JRC experts, providing a detailed list of SDG targets relevant in the context of the sustainability of food systems (the full list and explanation is available in Annex 1).

Figure 3. SDG targets identified in the extensive literature related to food systems



Source: Authors’ elaboration based on *SDG Mapper*, created with *flourish.studio*.

Note: the dimension of the bar is proportional to the number of keywords detected for each target. Goal-related keyword detections are also represented by bars labelled with the SDG number only (e.g. 13). The targets in colour have been detected in the F2F strategy, while the targets in grey are the additional ones identified through the literature review.

3.3 SDGs in the EU food system

In order to better contextualise the SDG mapping in the EU food system, the initial screening of SDGs in the F2F strategy, further complemented by the literature referring to sustainable food systems, was finally reviewed and validated also in consultation with experts in various Commission’s services. The final list of targets identified as directly impacted by the EU food system is presented in Table 2.

Table 2. List of SDGs and targets directly impacted by the EU food system

 <p>2 ZERO HUNGER</p>	<p>GOAL 2: ZERO HUNGER</p> <p>End hunger, achieve food security and improved nutrition and promote sustainable agriculture</p>
<p>2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round</p>	
<p>2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons</p>	

2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional, and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed

2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.

3 GOOD HEALTH AND WELL-BEING



GOAL 3: GOOD HEALTH AND WELL-BEING

Ensure healthy lives and promote well-being for all at all ages

3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being

3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

4 QUALITY EDUCATION



GOAL 4: QUALITY EDUCATION

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

6 CLEAN WATER AND SANITATION



GOAL 6: CLEAN WATER AND SANITATION

Ensure availability and sustainable management of water and sanitation for all

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

8 DECENT WORK AND ECONOMIC GROWTH



GOAL 8: DECENT WORK AND ECONOMIC GROWTH






Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors

8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value

8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment

	<p>10 REDUCED INEQUALITIES</p> <p>GOAL 10: REDUCED INEQUALITIES</p> <p>Reduce inequality within and among countries</p>
<p>10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard</p>	
	<p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p> <p>GOAL 12: RESPONSIBLE CONSUMPTION AND PRODUCTION</p> <p>Ensure sustainable consumption and production patterns</p>
<p>12.2 By 2030, achieve the sustainable management and efficient use of natural resources</p>	
<p>12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses</p>	
<p>12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse</p>	
<p>12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle</p>	
<p>12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities</p>	
<p>12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature</p>	
	<p>13 CLIMATE ACTION</p> <p>GOAL 13: CLIMATE ACTION</p> <p>Take urgent action to combat climate change and its impacts</p>
<p>13.2 Integrate climate change measures into national policies, strategies and planning</p>	
	<p>14 LIFE BELOW WATER</p> <p>GOAL 14: LIFE BELOW WATER</p> <p>Conserve and sustainably use the oceans, seas and marine resources for sustainable development</p>
<p>14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution</p>	
<p>14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</p>	
<p>14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels</p>	
<p>14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics</p>	
	<p>15 LIFE ON LAND</p> <p>GOAL 15: LIFE ON LAND</p> <p>Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss</p>
<p>15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements</p>	
<p>15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world</p>	
<p>15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species</p>	



GOAL 17: PARTNERSHIP FOR THE GOALS

Strengthen the means of implementation and revitalize the global partnership for sustainable development

17.10 Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda

17.14 Enhance policy coherence for sustainable development

Source: Authors' elaboration.

As highlighted above, this table focuses exclusively on SDGs which are directly impacted. However, additional SDGs and targets have important links with the EU food system as well, like SDG 5 on gender equality, SDG 9 on industry, innovation and infrastructure or SDG 16 on peace, justice, and strong institutions. Table 6 in Annex 1 provides a full list of all relevant SDGs and their targets along with explanations on the rationale behind the link between those targets and the EU food system.

Following this analysis, the list of SDGs and targets (Table 2) has been linked qualitatively to the sustainability elements identified for an EU sustainable food system (previously presented in chapter 2 and Table 1). Results are displayed in Table 3 below.

The table shows that all identified sustainability elements are linked to at least one SDG target (and vice versa), however, certain elements are less prominently addressed within the SDG framework than others, like ECON 5 on sustainable and fair trade or SOC 8 on animal welfare. Looking at the associated SDG targets also points to certain targets with a limited number of links to those sustainability elements like target 10.3 on ensuring equal opportunities and reducing inequalities of outcome or target 12.7 on promoting sustainable public procurement practices. On the other hand, target 17.14 on policy coherence for sustainable development is highly transversal in nature and links to all of the elements.

It is important to note that this analysis was conducted qualitatively. As such, the results presented herein are subject to contestation and may not be without imperfections. The subjective nature of qualitative analysis means that interpretations can vary, and different perspectives may lead to alternative conclusions. While every effort has been made to ensure the robustness and reliability of the findings, the inherent limitations of qualitative research should be acknowledged. This applies to the identification of sustainable food system elements that might overlook other relevant aspects as well as to the identification of relevant SDGs and substantiation of relationships between sustainability elements and SDGs.

Table 3. Key sustainability elements for an EU sustainable food system linked to SDG targets

SDGs		SUSTAINABILITY DIMENSIONS AND ELEMENTS																	
GOALS	TARGETS	ENVIRONMENTAL					ECONOMIC					SOCIAL							
		ENV 1	ENV 2	ENV 3	ENV 4	ENV 5	ECON 1	ECON 2	ECON 3	ECON 4	ECON 5	SOC 1	SOC 2	SOC 3	SOC 4	SOC 5	SOC 6	SOC 7	SOC 8
2	2.1																		
	2.2																		
	2.3																		
	2.4																		
	2.5																		
	2.c																		
3	3.4																		
	3.9																		
4	4.7																		
6	6.3																		
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8	8.2																		
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Source: Authors' elaboration

4 SDGs: current status and future trends








As discussed in Chapter 3, food systems are closely linked to the 2030 Agenda. Therefore, the current state of the EU food system has an impact on the achievement of the SDGs.





















Table 4 summarises results of the analysis carried out in 2022, showing the status of SDGs directly impacted by the EU food system and their future trends if no action is implemented. The analysis was elaborated based on analysis of available data as well as expert evaluation. The main sources of information used for the assessment were the status and trends of SDG indicators presented in the Monitoring report on progress towards the SDGs in an EU context” (Eurostat, 2022) and the SDSN Europe Sustainable Development Report (Lafortune et al., 2021).












At a glance, a challenging situation for SDGs and targets emerges, as depicted by the yellow and red dots. The most challenged are SDGs and targets on ecosystem conservation and enhancement, and the sustainable management of natural resources (water, land, soil, air). Concerning future trends, there are relevant differences across SDG targets. The trends depend on the expected long-term effect of ongoing initiatives and current practices in the Union food system. Some targets witness coexisting improvements and challenges, meaning that although there are ongoing initiatives that will potentially lead to positive effects, on the other side some challenges will continue. Currently, the status of many SDG targets is not favourable and, since no major changes are expected if no action is taken, SDG progress will likely face challenges in the future as well.


















Table 4 presents the overview of the main SDGs relevant in the EU food system, as identified in Table 2, with their correspondent current status and future trend expected. The rationale behind is further detailed by adding an explanation of the current situation and future trends.






















Table 4. Synthetized explanation for the SDG analysis of the current status and expected future trends

SDGs & targets		Current situation	Future trend	Explanation
 2 ZERO HUNGER	2.1			Increased food insecurity risks are linked to food system shocks. Low-income households are particularly vulnerable in accessing and affording sustainable food. Under current policies they will continue to be exposed to food products of lower nutritional quality and health inequalities will also likely persist.
	2.2			Current prevalence of obesity in EU is high. Low adherence to national food based dietary guidelines across the countries indicates diets within the EU are not in line with principles of healthy eating. Ongoing initiatives (revision of EU school scheme. Regulation on food information to consumers) will facilitate the consumption of healthier food products, but no major impacts are expected on the diet quality. It is not likely that under the baseline scenario a substantial and rapid change in food choices and diet quality towards healthier and more sustainable diets will happen.
	2.3			Agricultural factor income has been rising in Europe. Somewhat negative trend expected for business and primary producers. The sustainability requirements of the existing regulations and those voluntarily adopted by businesses generate a direct adjustment and compliance cost increase to the food chain actors. However, their impact on the competitiveness in the internal and international markets is expected to be small but rather positive overall. The impact on profit/income is less conclusive (based on the declaration of the business operators in their responses to the targeted consultation). Their actual effect will depend on the targeted sectors and the type and stringency of sustainability requirements that will be adopted.

SDGs & targets		Current situation	Future trend	Explanation
	2.4		 	Ongoing initiatives (Rules for CAP Strategic Plans, revised Regulation on sustainable use of pesticides) can bring improvements in some aspects such as productivity. The CAP support system is expected to continue incentivising the adoption of sustainable agricultural practices contributing positively to aspects such as landscape, biodiversity, carbon farming, climate change and sustainable management of natural resources. Nevertheless, the EU food system has a large global environmental and socio-economic footprint, driven by current unsustainable choices. Externalities are not reflected in the prices and costs of food, creating market distortion favourable for unsustainable food products and related operations.
	2.5			In the evaluation of new varieties, current EU rules on plant and forest reproductive material (PRM) focus on productivity, rather than sustainability. The current and ongoing status of biodiversity in farmland is poor (Farmland Bird Index), but we can observe a decrease in the use of more hazardous pesticides – both indicators according to Eurostat. The ongoing revision of PRM should align it with EU biodiversity and sustainable agri-food production objectives. Animal welfare label can bring benefits. Hence, ongoing policies can lead to positive effects, however, their actual impact remains challenging to define.
	2.c		 	Market transparency is increasing but expected to be heterogeneously across operators and supply chain actors. Market power has negative consequences for market access (in particular of small firms) and income distribution along the food chain.
3 GOOD HEALTH AND WELL-BEING 	3.4			The obesity rate shows a negative trend (Eurostat) and the vast majority of people are predisposed to unhealthy and unsustainable food choices and eating patterns. Unhealthy food choices are an important determinant of poor health and a risk factor for non-communicable diseases and premature mortality. Current trends indicate that the EU is far from reaching the SDG target. Ongoing initiatives will have positive health impacts (e.g. revision of EU school scheme, Regulation on food information to consumers) but no major changes are expected on diet quality and public health. Thus, the burden of disease related to diet is expected to remain high.
	3.9		 	Improvements exist in WASH related deaths (UN indicator) and standardised avoidable mortality (Eurostat). However, the food sector contributes to high levels of water, air and soil pollution and contamination. Chemicals inputs are widely used in the sector and can leak in the environment. Ongoing initiatives can have positive health impacts (revised regulation on pesticides, F2F targets to reduce by 50% pesticides by 2030, the Zero Pollution Action Plan, etc.). However, major challenges will remain due to the negative trend of environmental degradation.
4 QUALITY EDUCATION 	4.7			There is a current lack of education and awareness regarding sustainability, which prevents bigger uptake of healthier and more sustainable diets. Individuals are affected by behavioural biases. Ongoing initiatives (e.g. Recommendation on learning for the green transition and sustainable development, revision of EU school scheme) will support educational activities, sustainable food consumption and healthy lifestyles but no major changes are expected. The proliferation of different labels can contribute to consumers' confusion, lack of trust, recognition and attention to the label.
6 CLEAN WATER AND SANITATION 	6.3			Current eutrophication levels are high (Consumption Footprint eutrophication from 2010 to 2020: terrestrial, +27%; marine, +23%; freshwater, +10%; ecotoxicity: +22%). Food production activities will maintain high use of chemicals inputs, for example leading to run-offs of fertilizers leading to eutrophication. According to Eurostat, in the past years there has been increasing levels of nitrate in ground waters and phosphate in rivers.

SDGs & targets		Current situation	Future trend	Explanation
	6.4			<p>Current water use levels from food production are high (Consumption Footprint from 2010 to 2020: +19% water use). However, following Eurostat, EU water scarcity is a seasonal/geographical phenomenon and the consumption of scarce water is decreasing.</p> <p>Ongoing initiatives can both improve (code of conduct measures on better water management) and worsen (animal welfare label may result in increased consumption of meat) the situation.</p>
	6.6			<p>EU terrestrial protected areas have increased in the past years and, from 2000 to 2019, the biochemical oxygen demand in EU rivers has decreased of 24%; but inland bathing water quality has decreased (Eurostat). The ongoing high levels of eutrophication must also be considered (target 6.3). Current water-intensive practices in the food sector are likely to continue, as well as legislative mismatches (for example, the CAP Ecological Focus Areas goals and implemented action) thereby raising challenges on the effect of ongoing policy action (e.g., uneven implementation and limited effectiveness). At the same time, positive impact can arise from existing initiatives, for example Sustainable Use of Pesticides, Nature Restoration Law.</p>
	8.2			<p>Agricultural factor income per annual work unit (EU SDG indicator) has increased in the last two decades. This is also due to the uptake of new technology and innovation. The current Regulation on the Rules for the CAP Strategic Plans and the Communication on the Future of Food and Farming aims to foster knowledge and innovation and accelerate innovation. The adoption of sustainability innovation initiatives is expected to increase (i.e., more than 50% of surveyed operators and associations from the EU food supply chain implementing or plan to implement at least one type of sustainability innovation initiatives from six, technological innovation being one of them).</p> <p>With the existing policies, the benefits of the adaption of innovation initiatives are mostly expected in the environmental dimension, less in social or economic dimension, while some operators do not expect benefits, nor expect to realize loss from the sustainability innovations.</p>
	8.3			<p>The number of jobs generated in the EU food chain registered a growing trend in the last decade. However, in 2020, the number of persons employed in this field decreased to 29.5 million people (-4.2%).</p> <p>The literature suggests that there are imperfect competition and imbalances in market power in the food chain. We can observe imbalances in concentration between different stages of the agri-food chains in the EU and globally: downstream (retail) and midstream (processing and wholesale) segments of the agri-food chain tend to be more concentrated than primary production. This suggests the presence of imbalances in market power in the agri-food chain leading to asymmetries in bargaining power, which can have distortive effects, beyond prices and quantities, potentially leading to unfair trading practices (disfavour SMEs) and unfair income distribution along the food chain.</p> <p>The EU policy – through Geographical Indications (GIs), Traditional speciality guaranteed (TSG) and other schemes (e.g., mountain product) – is expected to contribute to the improvement of aspects such as fairer competition and returns for farmers.</p> <p>Homogeneity of sustainability requirements may also result in uneven additional direct costs and unfair competition between sectors.</p>
	8.5			<p>In the EU, a consistent gap remains between employment rates for EU and non-EU citizens, at 14.9 percentage points. Despite the recent improvements for both groups, the gap remains considerable (Eurostat, 2022).</p> <p>The average EU farmer currently earns around half of the average worker in the economy as a whole. Low-skilled workers and non-EU born workers are especially affected by in-work poverty.</p>

SDGs & targets		Current situation	Future trend	Explanation
8.8			 	<p>The EU agri-food ecosystem often relies on temporary contracts, part-time or self-employed and precarious employment. This can be linked to seasonality of much of agricultural production (e.g. agricultural seasonal workers) or physically demanding work, with high risk of injury and disability (e.g. meat processing workers). Poor working conditions, exploitation of migrant and seasonal workers, unfair remuneration and low generational turnover are reported as most prominent social impacts in the sector (ETI, 2015; ISTAT, 2022).</p> <p>A significant social challenge with respect to the employment conditions within the food systems, pertain the issue of forced labour, a condition that affects the EU as well (ILO, 2022). Ongoing initiatives (e.g. Directive on transparent and predictable working conditions in the EU, proposal for a Directive on adequate minimum wages) will complement existing obligations and set new minimum EU standards on working conditions for all workers. However, challenges will remain for the most vulnerable people (migrants, seasonal and not declared workers).</p>
10  REDUCED INEQUALITIES	10.3			<p>The most vulnerable populations (including children, lower income households) are particularly challenged in accessing food products of high nutritional quality.</p> <p>If there are no affordable and sustainable alternatives available, vulnerable households are more exposed to cheap food options which more often include hazardous chemicals.</p> <p>They are also most affected by socio-economic shocks such as increases in food prices, which weigh particularly on the most vulnerable households, who have to spend a higher share of their disposable income on basic goods such as food. No major impact is expected regarding diet quality, public health and inequalities. As result, inequalities will likely persist or widen. Vulnerable populations may continue being exposed to unhealthier food environments, which can be exacerbated by food system shocks.</p>
12  RESPONSIBLE CONSUMPTION AND PRODUCTION	12.2			<p>The current food system is highly resource intensive and consumption of raw materials is increasing (Consumption Footprint resource use, minerals and metals from 2010 to 2020: +7%).</p> <p>Ongoing initiatives can positively or negatively impact, depending on the resource considered (for example, some GPP measures have positive impacts on biodiversity loss but negative on water use), and current practices will likely continue to deplete resources.</p>
	12.3			<p>Considering the EU food flow in 2018, approximately 82Mt of food waste was generated along the food supply chain. There are inconsistencies across regions in adhering to national standards with potential implications for food waste. Ongoing initiatives may lead to food waste reduction (for example, GPP measures and EU proposal for legally binding targets to be set by 2023), but to a level considered insufficient to accomplish the goal.</p>
	12.5			<p>Levels of waste generation in the EU are elevated and increasing (as reported also by Eurostat).</p> <p>Ongoing initiatives could have a positive impact, however, diminishing waste generation per capita is uncertain as it currently relies on economic trends rather than efforts to reduce generation. Moreover, waste related to food processing and packaging is expected to increase.</p>
	12.6			<p>Mainly economic objectives incentivised for companies, mostly disregarding environment and health. Positive (but slow) progress trend.</p>
	12.7			<p>Lack of transparency and reliable, comparable information hampers the use of sustainability criteria in the public procurement of food.</p> <p>The EU Green Public Procurement program would remain voluntary and dealing with environmental aspects only. Since the first adoption of GPP criteria, there has been a positive trend in its uptake and this increase is expected to continue; however, a significant increase is not going to take place without further action since the current GPP criteria is a voluntary and non-monitored measure.</p>

SDGs & targets		Current situation	Future trend	Explanation
	12.8			Current sustainability-related food labels are not exhaustive nor harmonized. Individuals are affected by behavioural biases. Insufficient transparency on sustainability across the food system. The proliferation of different labels can contribute to consumers' confusion, lack of trust, recognition and attention to the label which could limit the potential demand for such products and the impact of the labels.
13 CLIMATE ACTION 	13.2		 	<p>The agricultural sector was responsible for more than 11% of total GHG emissions in the EU for 2020. GHG associated to food systems have increased since 1990 and currently represent a third of global anthropogenic GHG emissions. The Consumption Footprint from 2010 to 2020 shows a +24% for climate change. EU total GHG emissions have decreased since 2015 but agricultural sector emissions have fallen much slower, and net GHG removals from land use and forestry show a negative trend (Eurostat). The effect of ongoing initiatives can be positive (dietary changes) and negative (emissions linked to increased land use for organic products).</p> <p>Policies are in place to reduce emission, but their effectiveness may be limited by implementation challenges.</p>
14 LIFE BELOW WATER 	14.1		 	Current farming, agriculture and aquaculture activities are a source of water and marine pollution (e.g., nutrient loads, in relation to target 6.3, micro plastics). Organic and chemical pollution threatens marine ecosystems. However, there is a moderate increase in EU coastal bathing water quality (Eurostat). Ongoing initiatives, for example those aimed at reducing nutrient pollution and the amount of waste from food related activities and thus possibly reaching marine environments (including food packaging and fishing gear), can have a positive impact on target 14.1, yet current practices can also continue to pollute marine environments.
	14.2		 	EU Marine Protected Areas are increasing, but the conservation status of many habitats and species is poor (Eurostat). Although ecosystem conservation and an ecosystem-based approach to fisheries management are key to the CFP, some fisheries activities continue to cause detriment to biodiversity.
	14.3			Ongoing negative trends for EU seawater acidification (Eurostat). Moreover, reduction in emissions from agriculture is slow (target 13.2).
	14.4		 	Fish stock and biomass show positive levels of recovering in the Northeast Atlantic EU waters. Improvement exists also for Mediterranean and Black Seas stocks, however, most stocks continue to be fished outside biologically sustainable limits (FAO, 2022). Properly implemented CFP rules (e.g., discard bans, total allowable catches, ecosystem-based approach to fisheries management), are designed to support sustainable fisheries and stocks recovery. However, some unsustainable practices like overfishing or discards of unwanted catches may continue.
15 LIFE ON LAND 	15.1			<p>EU forested areas and terrestrial protected areas are increasing and the demand for biochemical oxygen in rivers is decreasing (Eurostat). However, conservation status of habitats and biodiversity is often poor, as well as water quality (targets 6.3, 6.6). The carbon sink capacity of EU forests is decreasing. Moreover, ongoing climate change has negative cascading impacts on ecosystems.</p> <p>Initiatives such as the Nature Restoration Law, the Sustainable Use of Pesticides, as well as ongoing objectives of the Farm to Fork Strategy, Biodiversity Strategy, the Zero Pollution Action Plan, the Proposal for a Regulation on deforestation-free products, dietary changes and existing pull measures, can improve the situation. However, these policies can also incur implementation challenges. Additionally, current practices in food production (and to some extent consumption) are likely to continue creating ecosystem damages, in the Union and non-EU countries (leakages through the supply chain).</p>

SDGs & targets		Current situation	Future trend	Explanation
15	15.3	●	➡	Soil loss, sealing and compaction, and desertification are challenging the EU soils and croplands are losing carbon. However, EU land area at risk of severe soil erosion by water has slightly decreased (Eurostat indicator). Initiatives can further improve the situation. Sustainable soil management and degraded land restoration is targeted by the EU Soil Strategy, CAP, Farm to Fork and Zero Pollution Action Plan, and Circular Economy Action Plan. However, these policies can also incur implementation challenges.
	15.5	●	➡	EU terrestrial protected areas are increasing (Eurostat), however, for many habitats and species conservation status is unfavourable (and not improving). Biodiversity indicators, such as the Common Bird Index and Grassland Butterfly Index have also shown significantly negative trends in the last years (Eurostat). Initiatives such as the Nature Restoration Law, the Sustainable Use of Pesticides, as well as ongoing objectives of the Farm to Fork Strategy, Biodiversity Strategy, the Zero Pollution Action Plan, and the Soil Strategy, dietary changes and existing pull measures can improve the situation. However, these policies can also incur implementation challenges. Current practices in food production (and to some extent consumption) are likely to continue environmental damages in terms of biodiversity loss.
17 PARTNERSHIPS FOR THE GOALS	17.10	●	➡	All EU trade agreements include a Trade and Sustainable Development (TSD) chapter but they do not explicitly account for sustainable food systems.
	17.14	●	➡	Current food system policies and initiatives are fragmented and without coherent action across policy fields they will remain fragmented, thus undermining PCSD.

Source: Authors' elaboration based on Eurostat and SDSN data.

Legend:

● Positive current situation	➡ Expected improvement
● Challenges	➡ Challenges will continue
● Major challenges	➡ Major challenges will continue
	➡ Coexisting improvements and challenges

The table highlights challenges in advancing the SDGs and the progress assessment underlines the need to step up efforts to implement the SDGs as there is no single goal progressing at the needed rate. While the EU has progressed on SDGs with a social or socio-economic dimension (SDG 2, 3 or 8), environmental goals like SDG 12 or 15 have seen stagnant or reversed trends for their targets despite increased policy efforts (Zero Pollution Action Plan, Nature Restoration Law, Soil Strategy, Biodiversity Strategy) and more efforts are needed to achieve those goals. When looking at specific targets, areas of progress emerge like for targets under SDG 2 related to agricultural incomes (target 2.3), more sustainable agricultural practices (due to Regulation on CAP Strategic Plans) or agricultural market transparency (target 2.c), despite remaining challenges like prevailing obesity rates (target 2.2). Other areas where more acceleration is needed are related to environmental pollution (target 6.3), resource use (target 12.2), biodiversity loss and environmental degradation (target 15.5) as well as policy coherence for sustainable development in general (target 17.14). This progress assessment already alludes to potential conflicts between different objectives laid out in the 2030 Agenda that will be further explored and substantiated in the next chapter to better understand possible interactions inside the food system.

5 SDG interlinkages within a sustainable food system and beyond

The transition to a sustainable food system deeply impacts the achievement of all SDGs, as emphasized by the UN Food Systems Summit in 2021. Within the food system, numerous cascading synergies and trade-offs can occur across the SDGs. This section analyses interlinkages among the SDGs most relevant to this food system transition, underlining the system's complexity and its potential for multifaceted consequences.

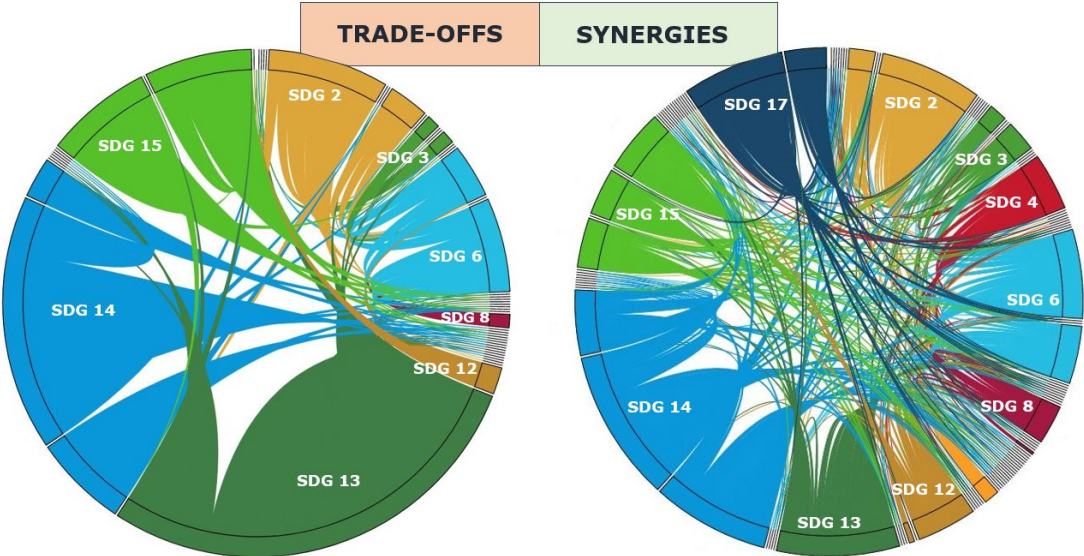
The sustainability elements of a sustainable food system (outlined in Table 3) are strongly intertwined with the 2030 Agenda and its SDGs. We can thus utilize SDG interlinkages as entry points or proxies for understanding interactions between sustainable food system elements. This analysis is key to understanding the impacts of the transition, maximizing positive effects, and minimizing potential drawbacks or unintended consequences.

Our analysis explores interactions across SDG goals and targets linked to various parts of the food system (see Table 2). These interactions can be positive or negative. Synergies represent cases where progress on one goal/target supports another, while trade-offs are negative interactions where advancing one SDG might hinder the achievement of another. The integrated nature of the 2030 Agenda allows for both positive and negative effects to occur simultaneously.

The analysis is based on the SDG Interlinkages database, which was built upon a structured literature review (ICSU, 2017) which informed the JRC Interlinkages Tool. The tool organises the collective knowledge on SDG interconnections emerging from the literature along with important methodological and contextual information on those interlinkages to better understand their possible implications for policy and decision making. To ensure the analysis reflects the EU food system, we combined this broad knowledge with expert consultations from various European Commission Directorate-Generals. Their insights clarified how relevant SDGs interconnect within the EU context and provided real-world examples (see Annex 2 for the methodology and data details).

The chord diagrams in Figure 4 visualize the internal interlinkages among the most relevant SDGs for the EU food system. Each line represents a connection between targets, either positive (right diagram) or negative (left). Line thickness indicates the number of interlinkages identified in the literature.

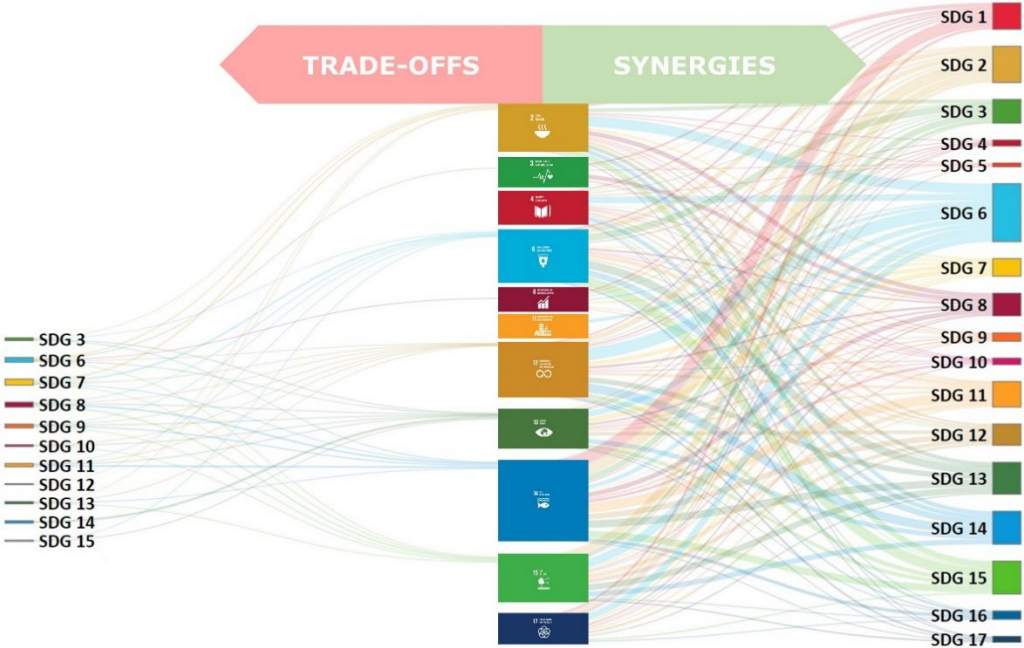
Figure 4. Interlinkages (trade-offs and synergies) among the SDGs related to an EU sustainable food system



Source: Authors' elaboration, based on SDG Interlinkages Tool.

Expanding beyond the complexity of such an overall picture, further in-depth analysis allows to gain useful insights on the nature of the interlinkages and the potential indirect impact that specific elements of the food system can have on other SDGs, even beyond the ones already identified as more relevant for the EU food system. In effect, the SDGs identified as most relevant for the EU sustainable food system are positively or negatively affecting practically all other goals. This is clearly depicted in Figure 5 below.

Figure 5. Interlinkages (synergies and trade-offs) between the selection of SDGs most relevant for a EU sustainable food system and the whole set of SDGs



Source: Authors' elaboration, based on SDG Interlinkages Tool.

The figure illustrates that synergies occur more frequently than trade-offs with 516 synergies identified at target level compared to 94 trade-offs. It further shows that interlinkages are targeting all SDGs, even though trade-offs only target a subset of goals, and no negative interactions were found by the literature for SDG 1, 2, 4, 5, 16 and 17. The myriad of interactions, both positive and negative, underline the complexity and interconnectedness – not only of the 2030 Agenda in general, but also of a sustainable food system in particular. The following sections aim to unravel this interconnectedness by delving deeper into the synergies and trade-offs of sustainable food system-related goals and targets to eventually make the associated complexity more approachable and tangible.

It becomes evident that, to effectively govern a sustainable food system transition within the EU (and beyond), practically all SDGs must be considered. In fact, the analysis shows several underlying positive interactions that could be kick-started from the transition to a sustainable food system. The next sections will describe some of the interlinkages highlighted in the figures in more detail, to better contextualise the interactions and further reflect on their implications for a sustainable food system within and beyond its system boundaries.

5.1 Synergies in a sustainable food system

SDG 2

The **SDG 2 “Zero Hunger”** emerges as the most strongly interconnected SDG as it is naturally all-encompassed in sustainable food systems and refers to different elements of sustainability. Several internal interlinkages between the targets of this SDG can be found, for example, the risk of food insecurity (target 2.1, on ending hunger and ensuring access to safe and nutritious food for all) could be reduced through improved agricultural productivity, with modern agriculture practices, and increased amount of irrigated arable land, and thus higher yields (target 2.3, on doubling the agricultural productivity of small-scale food producers through, amongst others, improved access to inputs) (Mainali et al., 2018). Obviously, access to nutritious food (target 2.2) contributes to ending malnutrition (target 2.1) (ICSU, 2017). Additionally, target 2.a on investments in rural infrastructure and agricultural research, has a positive impact on target 2.4, to ensure sustainable food production and resilient agriculture (Bandari et al., 2022; UNESCAP, 2017). Maintaining seed and animal genetic diversity (target 2.5) also contributes to agricultural outputs (target 2.3) by supporting the resilience of domesticated and cultivated systems. Many ancient crops exist in Europe and their cultivation could decrease the dependence from a limited number of staple crops.

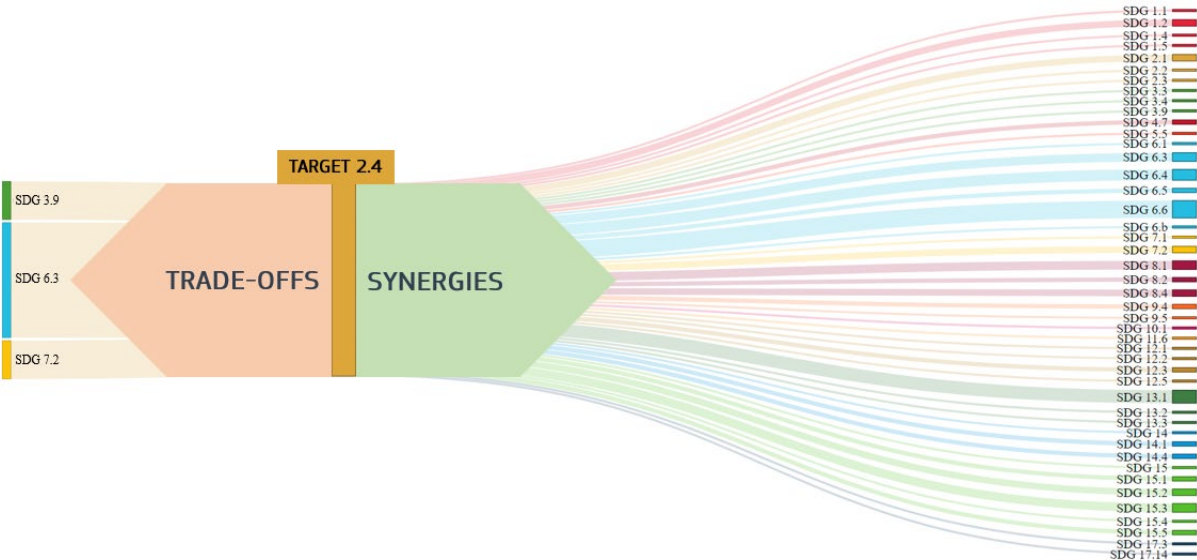
Beyond these internal interlinkages, the targets of SDG 2 relate to many other targets of the 2030 Agenda. A **sustainable increase of productivity and income from the food supply chain** (target 2.3) can help to reduce poverty (target 1.4) and inequality (SDG 10) and improve gender equality (SDG 5) because of the inherent increased access to resources, markets and infrastructures for small-scale food producers, including women ; (ICSU, 2017; Nilsson, 2017). In addition, a sustainable increase in productivity positively influences food security, nutrition, and economic growth (SDG 8) (Pingali & Plavšić, 2022). Sustainable food production practices also support the conservation of terrestrial and aquatic ecosystems and their resources, and translates into increased long-term productivity (e.g., targets 6.6, 15.4). And if energy efficient, food sector practices can also support SDG 7 on energy.

A special focus is needed for the important target 2.4 on **sustainable food production and resilient agricultural practices**, which unlock synergies with various SDGs (ICSU, 2017; Lyytimäki et al., 2021; UNESCAP, 2016; Wang et al., 2022). This is one of the most relevant targets for food

system sustainability, as it covers sustainable production and resource management, and systemic resilience, and it refers to sustainable food systems in its definition. The literature review shows many interlinkages with other targets (Figure 5), especially with SDG 6 on the sustainable management of water, and with SDG 15. Sustainable food systems require fewer inputs and thus protect natural resources (target 12.12). They help to maintain many regulating and supporting ecosystem services (e.g., soil formation, nutrient cycling) and diminishes land, soil, biodiversity degradation in marine and terrestrial ecosystems (targets 14.5, 15.3, 15.4). For example, methods such as integrated pest management and permaculture reduce pollutants runoff from agricultural activities and can lead to enhanced water quality and diminished ocean acidification (targets 6.3, 6.4, 6.6, 14.2, and 14.3). They can also have a positive impact concerning reduced urban poverty (e.g., peri-urban agriculture, SDG 1 and 11), especially if social considerations and increased adaptation to climate change are addressed. There is an evident need to support sustainable food production with sustainable consumption, i.e., more plant-based diets less reliant on products leading to intensive land use and deforestation, also in light of a growing global population and a more equitable allocation of resources.

Looking at other possible synergies, if production practices granting **seed, plant, and animal genetic diversity** (target 2.5) are supported, this can feedback in increased resilience to pests, droughts and heat, thereby improving adaptation to climate change (target 13.1) and maintaining biological diversity by preventing the extinction of threatened species (target 15.6) (ICSU, 2017; Pingali & Plavšić, 2022). On another side, a more sustainable food system able to **end hunger and ensure access to safe and nutritious food for all** (target 2.1, 2.2), can lead to positive effects on reducing end eventually eradicating poverty (target 1.1, 1.2) by enhancing diets and nutritional outcomes. As seen, there is a strong link between nutrition and health: better diets and nutritional quality are synergistic with maternal and new-borns health and the reduction of communicable and non-communicable diseases (NCDs) (targets 3.1, 3.2, 3.3, and 3.4) (ICSU, 2017; Nilsson, 2017).

Figure 6. Existing interlinkages (both synergies and trade-offs) for the SDG target 2.4 ²



Source: Authors' elaboration, based on SDG Interlinkages Tool.

² Target 2.4 "By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality".

SDG 3

At the same time, when **health targets** on reduced NCDs and exposure to hazardous chemicals and air, water, and soil pollution (targets 3.4, 3.9) are met, they contribute positively to issues regarding inequalities, for example territorial inequalities (Nilsson, 2017). Moreover, the reduction of inequalities of outcome and discriminatory laws (target 10.3) feedback positively on health. Ending discrimination (target 5.1) and granting women equal access to land, financial services, natural resources (target 5.a), also reduce inequalities and can trigger synergies with sustainable food production (target 2.3) (Nilsson, 2017).

SDG 4

Equal access to education is also key for sustainability. An option that pays attention to acquiring the education and **skills for sustainable development** (target 4.7), including **sustainable lifestyles** (target 12.8), can translate, among others, into less wasteful and more sustainable behaviour and consumption (Le Blanc et al., 2017; Vladimirova & Blanc, 2016). For example, choosing more plant-based diets can help reduce food waste and decrease resources exploitation. The role of science-based education and awareness raising is crucial to improve food literacy and create demand for sustainable food. In this context, it is necessary to skill, reskill, and train citizens and workers (see, for example, the agri-food system skills partnership in the framework of the European Skills Pact), also to overcome the ageing workforce and ensure decent work opportunities for the youth (target 8.5).

SDG 6

A wide array of benefits stem from **reducing water pollution**, the release of hazardous chemicals and the proportion of untreated wastewater (target 6.3), and from the **protection of water-related ecosystems** (target 6.6). A strong reciprocity between water and food exists, which also translates into health, environmental and economic improvements. Water use efficiency is prerequisite to crop production (Alcamo, 2019). More water-efficient practices allow for better irrigation of crops. Reducing contamination from land-based activities contributes to the maintenance of coastal and marine ecosystems (SDG 14, targets 14.1, 14.2, 14.3) (e.g., by reducing acidification of oceans). Hence, maintaining good water quality is key to fisheries and fisheries activities.

The sustainable management and **conservation of water and related ecosystems** also support terrestrial ecosystem services and biodiversity protection (targets 15.1, 15.2, 15.3, 15.5). In turn, safeguarding water-related ecosystems increases resilience to climate disasters, for instance, by reducing the risks of landslides and floods (SDG 13, target 11.6), (Karnib, 2019; UNESCAP, 2017). Better management of water is also essential for good health by reducing the number of illnesses and deaths from chemical contamination and effluent discharges (Hall et al., 2020; Milan, 2017; UNESCAP, 2016). Finally, water efficient food production can reinforce growth decoupled from environmental degradation (targets 8.4, 12.2) (Wang et al., 2022). For this, economic diversification, innovation and circularity are key (Anderson et al., 2022).

SDG 8

A transition towards sustainability has an impact also on SDG 8, ensuring **fair and safe working conditions** in the food sector, including temporary and seasonal workers from more vulnerable groups, such as migrants and women. Safer working environments for all workers (target 8.8) in the food sector reduce the exposure to dangerous substances, also in light of international labour standards on safety and health, and human rights due diligence in EU supply chains. Full and decent

employment (target 8.5) can also support activities in sustainable fisheries and aquaculture. Indeed, in the EU food system, ensuring sustainable livelihood for producers is essential for recovery and sustainable transition. Achieving target 8.5 would also feedback positively in gender equality: currently, inequalities and traditional gender roles are still persistent in the EU agriculture sector. Moreover, granting decent labour reduces poverty, increases productivity and decreases the likelihood of labour right abuses like child labour. Increased use of innovation and technologies (target 8.2 and 8.3) can in turn benefit food production, for example, through new crop varieties with higher yields, efficient irrigation systems, reductions in postharvest losses and lessened environmental impacts (target 6.3).

SDG 12

SDG 12 targets on **sustainable production and consumption** are central to food system sustainability: the positive impact of these targets reverberate on all the SDGs. **Food waste** affects food insecurity, especially decreasing the availability and increasing the cost of healthier foods. **Waste reduction** (12.3 and 12.5) including **food waste**, as well as sustainable management of natural resources (12.2), can feedback in reduced detrimental environmental impacts and job creation (Jacob-John et al., 2021). For example, sustainably managing and recycling resources can help reducing marine pollution and debris (ICSU, 2017); and halving food waste can lead to fewer emissions (Jacob-John et al., 2021) and ease the pressure put on water in terms of pollution, extraction, and overfishing (Alcamo, 2019; UNESCAP, 2017). If waste is inevitable, by adopting a circular approach, this can become a source of bioenergy.

Integrating **sustainability information into companies** reporting cycle and adopting **sustainable public procurement practices** (targets 12.6 and 12.7) can directly lead to improved water management and use efficiency in the agricultural sector thanks to cost savings and value creation (UNESCAP, 2016), while also reducing the amount of harmful dangerous material finding their way into wastewater (ICSU, 2017) and their health impacts. The inclusion of good-quality information in reporting can also help identifying environmental hotspots where action is needed. Moreover, in the EU, green public procurement (GPP) can help reducing the environmental footprint of the food sector and enhancing sustainable consumption.

SDG 13

As discussed so far, many are the positive impacts on climate change, natural resources and environmental protection. In turn, measures that integrate **climate mitigation and adaptation** (target 13.2) can indirectly affect many other SDGs. Climate policies targeting, for instance, sustainable food systems, better animal standards, and reductions in carbon intensive food consumption can synergistically benefit physical and mental health, ensure access to nutritious food from sustainable agriculture, and improve adaptive capacity and climate change mitigation. For example, both health and the environment benefit from climate actions reducing the production and consumption of meat and favouring the use of technologies like no-tillage agriculture or optimized fertilizers delivery, thus reducing GHG emissions, water evaporation and loss of soil nutrients (Iacobață et al., 2021).

SDG 15

The conservation, restoration and **sustainable use of terrestrial and inland freshwater ecosystems** and their services (target 15.1), combating desertification (target 15.3) and halting habitats degradation and biodiversity losses (target 15.5) all enable sustainable agriculture (Alcamo, 2019; ICSU, 2017; UNESCAP, 2016). Indeed, good soil conditions allow for water quality via nutrient retention, and protecting ecosystem underpins crops and livelihoods resilience to

extreme weather events. In the EU too, restored ecosystems allow for resilient agriculture, which in turn improves ecosystem and soil quality. Moreover, since species like salmon and eel spawn in freshwaters, conserving freshwater ecosystem reinforces SDG 14.

SDG 14

At the same time, **improving the status of coastal and marine ecosystems** (14.1, 14.2, 14.3) can increase economic, societal, and environmental resilience and adaptive capacities to climate change (ICSU, 2017; Le Blanc et al., 2017). Healthy and productive marine environments are a premise to fisheries and aquaculture and support diversification via tourism, biotechnologies, blue carbon markets, etc., thus contributing to decent growth and business development, food security and nutrition. The reduction of nutrient-based eutrophication and pollution can support land and marine food production. Moreover, oceans naturally act as a climate regulator, absorbing heat and CO₂: the sustainable management of coastal zones reduces climate risk and safeguards natural heritage in support of both SDG 13 and 11.

Moreover, there is a self-reinforcing loop between progress on SDG 14 targets and sustainable production and consumption and (food) waste reduction (SDG 12 targets). Regulating overfishing and ensuring sustainable fishing practices will feedback into reduced waste, for example from fishing gears, and food waste, through implementation of discards bans and selective fishing (Le Blanc et al., 2017; Singh et al., 2018)). Health benefits are also present: reduced pollution implicates fewer deaths due to contaminated waters, and stable supplies of fishery products provide an efficient source of micronutrients and protein for diets (Singh et al., 2018; UNESCAP, 2017). Combating illegal fishing and promoting sustainable fisheries can also lead to diminished corruption and fairer and less exploitative sources of income and employment, thus contributing to SDG 16 and, less directly, to access to education and women's participation (Horan, 2020; Singh et al., 2018).

SDG 17

Finally, in general, enhancing **policy coherence**, capacity building, and multi-stakeholder partnerships can foster an enabling environment for sustainable food systems thanks to inclusive and innovative governance practices from institutions with adequate capacities to implement sustainability in the food system.

5.2 Trade-offs in a sustainable food system

The impact of a measure on specific SDGs can also entrench detrimental dynamics or give rise to trade-offs. This happens for two reasons. If SDGs targets are achieved disregarding sustainability objectives, this may negatively affect other targets. This is the case for many SDG 2 targets, which can be unsustainably advanced depending on the approach, with target 2.3 on agricultural productivity being the most controversial. Trade-offs are inevitable, at least for some time or at a certain spatial scale. In this case, well-designed policies play a key role in reducing and redistributing the burden of trade-offs.

Many are the drawbacks of progressing on SDG 2 targets without integrating sustainability principles. Granting food nutrition and security with **conventional methods focused only on productivity** and without shifts to increasingly sustainable production and consumption patterns will imply ongoing land-use change, deforestation and land degradation (SDG 15 targets); more water withdrawals (SDG 6); increased chemical releases and air pollution (SDG 11); reduced health (SDG 3 targets); increased emissions (SDG 13 targets); harm to ecosystems (SDG 14, 15 targets)

(Alcamo, 2019; Bandari et al., 2022; Nilsson, 2017). Hence, the need to couple sustainability in production with producing foods that are less resources-intensive, more ethical and less wasteful is fundamental.

Ongoing unsustainable production and consumption practices based on exploitation, overuse and degradation of ecosystems and biotic resources can negatively affect the long-term sustainability and resilience of food systems (target 2.4). As stressed in (ICSU, 2017), the **livestock industry** contributes to land clearings, deforestation and biodiversity losses (targets 15.1, 15.2, 15.5). Expanding cultivated land or intensifying production (target 2.3) under business-as-usual can also create competition over water resources, and degrade surface and ground waters (target 6.3): on cropland, water can pick up salts and residues from fertilizers and pesticides (Karnib, 2017). Nutrients leakages feedback negatively in damaged terrestrial and aquatic ecosystems, generating losses in biodiversity (Le Blanc et al., 2017). Moreover, **intensification in livestock and aquaculture** can imply more antibiotic use and thus contamination and antimicrobial resistance (ICSU, 2017).

The **relationship between food and health** is inextricable yet also dependant on policy choices: improvements in food production in quantitative terms without considerations of nutrition, including micronutrients deficiency and obesity, can counteract health targets (Nilsson, 2017). For example, evidence links NCDs (target 3.4) and exposure to persistent organic pollutants and contaminants entering waters (target 6.3) that can accumulate in fish. Hence, food sector activities causing the release of hazardous substances create negative feedback for human health, particularly for new-borns, children and workers in the food sector (also linking to target 3.9) (ICSU, 2017; Singh et al., 2018), both in EU and third countries.

Uncontrolled **use of chemicals and unsustainable management of resources** (targets 12.2 and 12.4), while trying to achieve higher levels of productivity (2.3), can further entrench waste generation from the food sector (targets 12.3, 12.4, 12.5). In turn, continued practices around food production, loss, and waste that make healthy food more expensive can contribute to increased **consumption of cheap ultra-processed food**, thus reiterating patterns of poor nutrition (Jacob-John et al., 2021). Following sudden increases in food price (target 2.c), when more sustainable alternatives are not affordable, poor households tend to switch to cheap, nutrient-poor, calorie-dense foods that adversely affect health (target 2.2, 3.4).

Poor management of agricultural waste is also one of the main sources of pollution of bodies of waters and marine environments with ubiquitous chemicals and plastics (targets 6.3, 12.4, 14.1) (UNESCAP, 2016). Fishing and aquaculture activities (14.4) can also cause **marine degradation** by dispersing equipment, waste, fuel, as well as causing wastage of food – for example, discarded fish (Le Blanc et al., 2017). These unsustainable practices can have multiple impacts on biodiversity, both for target species and other species due to perturbations in food chains and by-catches (Le Blanc et al., 2017).

In general, **increasing the economic productivity** of the food sector (target 8.2) without overexploiting natural resources (e.g., water quality) is challenging. Moreover, higher productivity and modernisation not always imply socio-ecological improvements; they can also backfire, bringing even more pressures on water, air and soils. In these regards, innovation not based on technologies but rather on traditional knowledge (such as permaculture and agro-ecology) can strengthen the resilience against socio-economic shocks and support stability and food security in the long-term, even with lower yields.

Other trade-offs are inherent to how SDGs targets are shaped and require careful balancing to counteract possible short-term detrimental effects. For example, even if integrating climate change

measures into policies (target 13.2) has many long-term benefits for socio-economic and ecological resilience, it can also lead to short-term trade-offs with SDGs 1 on poverty and 8 on growth because of **job losses in more polluting industries** (target 8.5), therefore affecting vulnerable segments of society (target 1.5) (Stevenson et al., 2021). Similarly, conservation measures applied regardless of socio-economic considerations can lead to detrimental effects on livelihoods (ICSU, 2017). Even if the establishment of marine protected areas has longer-term synergies with preventing the overexploitation of fish resources and diversifying economic activities, protected areas may also bring **short-term losses in the fishery sector**. At the same time, if the focus is only on short-term losses, there is the possibility of entrenching long-term vulnerability in the food system because of the long-lasting and far-reaching effects of issues like environmental degradation on food production and consumption. Understanding such interconnectedness and re-designing the food system as a whole by increasing its sustainability in an integrated way is necessary to ensure the achievement of Agenda 2030 objectives and SDGs.

Policies play a fundamental role in diminishing the possibility of trade-offs by considering context and acting in a cohesive and integrated manner. For example, there should not be contradictions between rules on coastal infrastructure or fish harvesting and marine protected areas (Le Blanc et al., 2017). Broad management plans and clear guidelines are thus necessary. Policies must account for issues of access, nature-culture nexus and cost of adaptation, among others, as well as the speed at which policy change happens and which policy mix to apply to grant a just transition (Stevenson et al., 2021). Re-skilling and re-training programmes can support the communities bearing the burden of policy-related job losses.

To conclude, it should be noted that these examples of SDG interlinkages are a mere snapshot of the existing interactions between sustainable food system-related SDGs and beyond and most probably only a fraction of them have been identified and assessed by the academic literature so far. It is important to note that those interlinkages were identified by various publications through certain methodologies in distinct contexts and existing interactions might, hence, unfold differently in regions underpinned by specific economic, socio-cultural and environmental systems. Applying an SDG interlinkages perspective as a proxy for interactions between food system elements and beyond can help in better understanding the interconnectedness and complexity of a sustainable food system and further contribute to the knowledge base needed for re-designing the food system as a whole, increasing its sustainability in an integrated way and fostering the achievement of Agenda 2030 objectives and SDGs.

6 Conclusions

This report aimed at **identifying key sustainability elements** in the EU food system that address various sustainability dimensions and should constitute the conceptual bases of any attempt to sustainably transform current food systems. Within and beyond the EU's food system boundaries, a sustainable food system perspective also has important implications for larger sustainability objectives as laid out in the 2030 Agenda with its SDGs. In fact, a transition towards sustainable food systems has profound implications for the achievement of all the SDGs, as also indicated in the Food Systems Summit in 2021.

Findings highlight the **complexity of the food system**. The myriad of SDG interlinkages reveals complex interaction patterns between food system elements but also between the food system as a whole and other social-ecological systems it interacts with (like our economic system, energy, health, cultural and societal systems). While this highlights the high degree of interconnectedness on one side, it also emphasises the importance for policy making to carefully consider existing trade-offs while harnessing synergies. Interlinkages underline the potential of a sustainable food system transformation to support the overall advancement of sustainability objectives like the SDGs including those not directly linked to a sustainable food system. The findings provide conceptual guidance on developing targeted policy interventions to effectively govern a sustainable food system transformation.

As we reflect on the current status and future trends in relation to the Sustainable Development Goals (SDGs), it becomes imperative to underscore the importance of **considering interlinkages** across temporal and spatial scales, also recognising specific context-dependent aspects that could characterize those linkages. This approach is vital not only for capturing the immediate impacts of our actions but also for acknowledging potential intergenerational or geographical spillover effects (Fuchs et al., 2020). The externalization of costs, both economic and environmental, poses a significant risk to sustainable development efforts globally. Addressing these issues requires a concerted effort to incorporate broader perspectives and analyses that span beyond our current generation and geographical boundaries.

In complementing the previous discussions, it is crucial to **highlight some key sustainability elements** that are foundational to achieving the SDGs. These include promoting sustainable practices across all sectors, enhancing biodiversity conservation, and ensuring equitable access to resources. Additionally, the interplay between key SDGs should be emphasized, such as the synergies between SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land). These interactions are critical for fostering a holistic approach to sustainability, recognizing the interconnectedness of the Sustainable Development Goals (SDGs). From environmental protection to social justice and economic well-being, addressing these multifaceted challenges requires coordinated action that aligns with the UN's 2030 Agenda.

Moreover, the pursuit of sustainable development must be underpinned by **robust governance frameworks** that encourage participation, transparency, and accountability. The integration of environmental considerations into policymaking and the mainstreaming of sustainability across all levels of governance will be paramount in this endeavour and should be leveraged by embracing a multi-stakeholder approach to capitalise on different perspectives. This includes leveraging innovative technologies and practices that can facilitate the transition towards a more sustainable and resilient future.

Despite pinpointing sustainability elements for food systems that emerged from the literature and high-level expert groups, more high-quality, robust data is needed to further substantiate these elements as well as their relationship with the SDGs. Similarly, quantitative approaches capturing

SDG interlinkages are needed to better account for specific geographic, socio-economic and cultural contexts of EU food systems as interlinkages might unfold differently depending on the context. Data driven approaches should complement this study to effectively quantify the impact of sustainable food system transitions on broader sustainable development objectives like the SDGs in the EU and beyond.

In conclusion, our collective commitment to the SDGs **calls for an inclusive and integrated approach** that acknowledges the complex interdependencies within our global ecosystem. By considering the interlinkages across temporal and spatial scales, and highlighting key sustainability elements and SDG interactions, we can pave the way for a sustainable future that benefits all. The journey towards 2030 and beyond requires unwavering dedication, collaborative efforts, and innovative solutions that address the multifaceted challenges of our time.

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Annexes

Annex 1. A wider mapping of SDGs and their relevance for sustainable food systems

As described in the main text, the screening of SDGs in the F2F Strategy was further complemented by the analysis of additional relevant documents (articles, reports, policy documents etc.) specifically referring to sustainable food systems. This detailed and enlarged literature review allowed to identify a consistently larger set of SDGs and targets that is listed in the Table below. The column ‘Explanation’ clarifies the reasons why the targets are relevant for the sustainability of food systems and indicate as well the reference to the F2F Strategy, where available. In fact, some of the SDG targets are indeed remarkably close to objectives of the F2F strategy.

Table 5. List of relevant SDGs and targets for the sustainability of the food system

		EXPLANATION
 GOAL 1: No Poverty End poverty in all its forms everywhere		
1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions		Poverty reduction is essential to end hunger and ensure food for all. Vice versa, food security is a precondition to end poverty.
1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable		Social protection programs have positive effects on the capacity of farm households to become more productive and resilient.
1.4 By 2030 ensure that all men and women, particularly the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership, and control over land and other forms of property, inheritance, natural resources, appropriate new technology, and financial services including microfinance		Dedicated policies to address collective rights to land and resources, especially for indigenous people, are important to ensure food security
1.5 By 2030 build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters		Food systems that are resilient to extreme events reduce the impact of such events on the most vulnerable.
 GOAL 2: ZERO HUNGER End hunger, achieve food security and improved nutrition and promote sustainable agriculture		
2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round		F2F objective: access to healthy, sustainable, affordable food
2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons		F2F objective: access to healthy, sustainable, affordable food



	EXPLANATION
2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment	F2F "Fair economic return in the food chain"
2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	Linked to F2F objective "Ensuring sustainable food production" and relevant target of "25% of total farmland under organic farming by 2030".
2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed	Agricultural biodiversity is a source of nutritious foods, which are often adapted to local and low-input agricultural systems. It is also important for breeding resilient, nutritious crops and animal breeds.
2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries	According to the principles set out in the Voluntary Guidelines on Food Systems and Nutrition (VGFSyN), coherent, coordinated, context-specific and inclusive policies and related responsible investment through coordinated actions among different actors and across all relevant sectors at international, regional, national, subnational, and local levels are needed.
2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round	Trade is a key driver for food security and agri-food systems. It is essential to go beyond the traditional rhetoric opposing the global agri-food system and more territorialized agri-food systems in order to trigger an effective transition of all agri-food systems so that they become powerful drivers for food security and human and planetary health, in accordance with the SDGs.
2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.	Protecting consumers and their ability to acquire nutritionally adequate diets in the face of current and projected increases in food prices and food price volatility is a key aspect of a sustainable food system.
 3 GOOD HEALTH AND WELL-BEING GOAL 3: GOOD HEALTH AND WELL-BEING Ensure healthy lives and promote well-being for all at all ages	
3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases	Reducing the use of antibiotics in animal breeding prevents the spread of antimicrobial resistance and the spread of new diseases/pandemics. According to F2F target to address antimicrobial resistance, the Commission will reduce by 50% the sales of antimicrobials for farmed animals and in aquaculture by 2030.
3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being	F2F objective: 'facilitating the shift to healthy, sustainable diets' (Improved nutrition benefits for health.)


	EXPLANATION
3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	Sustainable agriculture practices have a lower impact on pollution
3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks	Preventing antimicrobial resistance is an example of risk reduction
<div style="background-color: #c00000; color: white; padding: 10px;"> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 20px;"> <p style="font-size: 24px; font-weight: bold; margin: 0;">4</p> <p style="font-size: 10px; margin: 0;">QUALITY EDUCATION</p>  </div> <div> <p style="font-size: 18px; font-weight: bold; margin: 0;">GOAL 4: QUALITY EDUCATION</p> <p style="margin: 0;">Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</p> </div> </div> </div>	
4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	Adequate skills for farmers and other workers of the supply chain are needed for their empowerment and for the improvement of the overall system
4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development	Educational messages are crucial to encourage people towards the transition. Awareness and knowledge on sustainable lifestyles are preconditions needed for adopting sustainable agricultural practices and for integrating and strengthening sustainability in food systems
<div style="background-color: #ff0000; color: white; padding: 10px;"> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 20px;"> <p style="font-size: 24px; font-weight: bold; margin: 0;">5</p> <p style="font-size: 10px; margin: 0;">GENDER EQUALITY</p>  </div> <div> <p style="font-size: 18px; font-weight: bold; margin: 0;">GOAL 5: GENDER EQUALITY</p> <p style="margin: 0;">Achieve gender equality and empower all women and girls</p> </div> </div> </div>	
5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws	Gender inequality is a key barrier to transitions to Sustainable Food Systems in many contexts. Land is a key asset for poverty reduction, yet systemic discrimination has tended to reproduce prevailing inequalities in land access, ownership and control between men and women. A legal framework to guarantee women's equal rights to land is crucial
<div style="background-color: #00a0e3; color: white; padding: 10px;"> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 20px;"> <p style="font-size: 24px; font-weight: bold; margin: 0;">6</p> <p style="font-size: 10px; margin: 0;">CLEAN WATER AND SANITATION</p>  </div> <div> <p style="font-size: 18px; font-weight: bold; margin: 0;">GOAL 6: CLEAN WATER AND SANITATION</p> <p style="margin: 0;">Ensure availability and sustainable management of water and sanitation for all</p> </div> </div> </div>	
6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all	Drinking water is crucial in food preparation, and unsustainable food systems have a negative impact on its availability.
6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	In line with F2Ftargetto "reduce nutrient losses by at least 50%", "reduce fertilizer use by at least 20% by 2030", "reduce by 50% the use and risk of chemical pesticides by 2030", and "reduce by 50% the use of more hazardous pesticides by 2030."
6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	Agriculture is a major source of freshwater withdrawals. Water plays a cardinal role in all aspects of food systems, from production, processing, preparation, consumption, and in part, distribution. Access to essential volumes of water of appropriate quality is fundamental to the existence of secure food systems and a stable society.

	EXPLANATION
6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate	Greater pressure on water resources and stronger interconnectivity between sectors call for new, integrated approaches to agricultural water management and it is likely that the role of agricultural water management in ensuring food security will become more important.
<p>7 AFFORDABLE AND CLEAN ENERGY</p> <p> GOAL 7: AFFORDABLE AND CLEAN ENERGY Ensure access to affordable, reliable, sustainable and modern energy for all</p>	
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	Farmers can reduce methane emissions from livestock by developing the production of renewable energy and investing in anaerobic digesters for biogas production from agriculture waste and residues, such as manure.
7.3 By 2030, double the global rate of improvement in energy efficiency	Food companies can become more energy efficient.
<p>8 DECENT WORK AND ECONOMIC GROWTH</p> <p> GOAL 8: DECENT WORK AND ECONOMIC GROWTH Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all</p>	
8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries	The basic condition for improvement in world food security is economic growth and growth in real incomes, especially in poorer countries.
8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors	In the long run higher productivity can foster a realization of human well-being, to free up human activity to be channelled toward more interactive, skill-intensive food production systems, where communal efforts can reduce industrial reliance, diversify farming, and reconnect people to the biosphere.
8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services	Entrepreneurship has been the driving force in designing and developing innovative food strategies at country and regional level.
8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead.	Improving resource efficiency in consumption and production is important in the food system to reduce environmental degradation. A more sustainable food system shall be decoupled from economic growth
8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	The agriculture sector is characterized by deep deficits on all four main points of the ILO's Decent Work Agenda: workers' rights, employment and incomes, social protection and social dialogue. A sustainable food system. FAO believes that ensuring the access to decent farm and non-farm employment for the rural poor in food chain is critical to realize sustainable food system.
8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	The considerations of working conditions as well as protection of health and safety will play a major role in building fair, strong and sustainable food systems

EXPLANATION

 <p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p> <p>GOAL 9: INDUSTRY, INNOVATION AND INFRASTRUCTURE Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</p>	
9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets	Relevant for small scale producers that produce in a sustainable way to better integrate into the value chain and markets
9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending	F2F implementation: EUR 10 billion under Horizon Europe to be invested in R&I related to food, bioeconomy, natural resources, agriculture, fisheries, aquaculture and environment.
 <p>10 REDUCED INEQUALITIES</p> <p>GOAL 10: REDUCED INEQUALITIES Reduce inequality within and among countries</p>	
10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status	In terms of social sustainability (inclusiveness, equitability), the value chain should generate additional value (additional profits and wage incomes in particular) that benefits sufficiently large numbers of poor households, equitably distributed along the chain.
10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard	The principle of non-discrimination should guide individual and collective actions in FS legislation, to progressively realize the right to adequate food for all.
 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p> <p>GOAL 11: SUSTAINABLE CITIES AND COMMUNITIES Make cities and human settlements inclusive, safe, resilient and sustainable</p>	
11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	Urban expansion can negatively impact the availability of agricultural land and vice versa.
11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	Including food waste management
11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	Link between rural and urban, producers and consumers, actors along the food chain
 <p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p> <p>GOAL 12: RESPONSIBLE CONSUMPTION AND PRODUCTION Ensure sustainable consumption and production patterns</p>	
12.2 By 2030, achieve the sustainable management and efficient use of natural resources	F2F objective: 'Ensuring sustainable food production', 'Stimulating sustainable food processing, wholesale, retail, hospitality and food services', 'Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets'
12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	F2F objective: halving per capita food waste at retail and consumer levels by 2030. The Commission will propose legally binding targets to reduce food waste across the EU by 2023.

	EXPLANATION
12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	F2F objective: "reduce by 50% the use and risk of chemical pesticides by 2030"; "reduce by 50% the use of more hazardous pesticides by 2030".
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	F2F objective protect the environment: "waste management, circular economy"
12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities	Public procurement supports sustainable farming and healthy diets by i) requiring externalities to be included in cost calculations; & ii) including food sustainability & nutrition guidelines in Green Public Procurement
12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature	F2F: "Strengthen educational messages on the importance of healthy nutrition, sustainable food production and reducing food waste".
<div style="background-color: #4CAF50; color: white; padding: 10px;">  <p>13 CLIMATE ACTION GOAL 13: CLIMATE ACTION Take urgent action to combat climate change and its impacts</p> </div>	
13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	F2F objective Tackle climate change: mitigation and adaptation
13.2 Integrate climate change measures into national policies, strategies and planning	Climate change measures related to agricultural production (including food industries)
<div style="background-color: #2196F3; color: white; padding: 10px;">  <p>14 LIFE BELOW WATER GOAL 14: LIFE BELOW WATER Conserve and sustainably use the oceans, seas and marine resources for sustainable development</p> </div>	
14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	Nutrient inputs, fertilizer and pesticide use in food systems are directly linked to marine and nutrient pollution
14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	Sustainable fishing practices. In parallel to changes in agriculture, the shift to sustainable fish and seafood production must also be accelerated)
14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels	Link to climate change impacts
14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	Sustainable fishing practices. The EU will apply zero tolerance in the fight against illegal, unreported and unregulated fishing (IUU) and combat overfishing,
14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation	It is essential that fisheries management is empowered to operate effectively, and in combination with effective government policy ensure that fisheries recover in a sustainable manner.

	EXPLANATION
14.b Provide access for small-scale artisanal fishers to marine resources and markets	Small-scale fishers are among the most marginalized food producers, beckoning the international community to take action. The COVID-19 crisis adversely affected their livelihoods as global demand for seafood dwindles and transportation restrictions prevent market access. At the same time, these small-scale food producers fulfil a vital role, to be recognized and protected.
14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of “The future we want”	Sustainable use of oceans links to sustainable food production (further, the EU is a party of the Law of the Sea Convention)
<div style="background-color: #4CAF50; color: white; padding: 5px;">  <p>15 LIFE ON LAND</p> <p>GOAL 15: LIFE ON LAND Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss</p> </div>	
15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	Sustainable management and protection of landscape and environment protects food system from extreme natural events (flooding, droughts, fires, pests etc.). A sustainable food system would enable and facilitate management and conservation of landscape (reduced LULUCF, pollution by agricultural and food processing chemicals, emission etc). Biodiversity Strategy: Establish biodiversity rich landscape features on at least 10% of the farmland
15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	Biodiversity Strategy: plant over 3 billion diverse biodiversity rich trees. Link to also to climate mitigation
15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	Biodiversity Strategy: Restore degraded ecosystems and further damage to nature F2F Strategy: protect land and soil
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	Biodiversity Strategy: Reverse the decline of pollinators. F2F Strategy: reverse loss of biodiversity
15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts	Biodiversity Strategy, F2F Strategy: Manage 25% of agricultural land under organic farming and promote the uptake of agro-ecological practices
<div style="background-color: #0070C0; color: white; padding: 5px;">  <p>16 PEACE, JUSTICE AND STRONG INSTITUTIONS</p> <p>GOAL 16: PEACE, JUSTICE AND STRONG INSTITUTIONS Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels</p> </div>	
At goal level	Conflict hinders food security and thus peace and appropriate global governance are key for sustainable food systems. At the same time, food security and nutrition are a prerequisite for the realization of human rights and the prevention and mitigation of conflict, as well as contributing to the legitimacy of institutions.

		EXPLANATION
16.6	Develop effective, accountable and transparent institutions at all levels	Institutional capacity, innovation, transparency, inclusion, accountability, and policy innovation are needed to enable systemic investment in transformation of food system and ensure stakeholders' participation, capacity building, food safety, food waste reduction, increased quantity, affordability and quality of food, and general robust and monitored progress towards food system sustainability minimizing trade-offs.
16.b	Promote and enforce non-discriminatory laws and policies for sustainable development.	Sustainable Food Systems require an efficient governance framework for protecting and managing environmental and agricultural resources, which requires accountability and strong enforcement of environmental protection monitoring and laws.
17	PARTNERSHIPS FOR THE GOALS 	GOAL 17: PARTNERSHIP FOR THE GOALS Strengthen the means of implementation and revitalize the global partnership for sustainable development
	At goal level	Achieving SDGs goes hand in hand with food systems transformation. It is impossible to tackle sustainability issues of food systems (waste, nutrition, safety, access, youth inclusion, innovation, training etc.) without the coordinated contribution of different food actors forming inclusive partnerships.
17.6	Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism	Funds and partnerships provide means for R&I in food systems. Multisectoral cooperation provides technical support. Projects/investments/initiatives can support technology transfer and infrastructure investment, and local knowledge-building and knowledge-sharing with consequential increases in yield and smallholder income.
17.10	Promote a universal, rules-based, open, non-discriminatory, and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda	The growing financialization and liberalisation of the agri-food sector are argued to have amplified socio-economic disparities, e.g., in food security in the Global South, thus hampering the transition to a sustainable society. In pursuing WTO reform, the EU should seek to ensure that promoting sustainable food systems becomes a more central goal. Equitable multilateral trading systems should be mindful of developing and Least Developed Countries. An example are Fair Trade partnerships.
17.13	Enhance global macroeconomic stability, including through policy coordination and policy coherence	The transformation of the food system needs an enabling environment through country commitment, sound policies and active policy coordination across multiple sectors and public actors. International, regional, and national coordination mechanisms facilitate, among others, policy convergence.
17.14	Enhance policy coherence for sustainable development	Policy can play a crucial role in enabling transformative change for food systems, mitigating trade-off and exploiting synergy, through coherent and integrated policies adopting an overall system approach.

	EXPLANATION
<p>17.17 Encourage and promote effective public, public private and civil society partnerships, building on the experience and resourcing strategies of partnerships</p>	<p>Food system governance is complex and multidimensional and requires coordination involving different stakeholders, at different scale, coming from the three spheres of society. Multi-stakeholder and public-private partnerships can contribute to building trust, pooling resources, sharing risks and responsibilities, and increasing participation, thus generating positive results for food systems efficacy. In EU, many examples exist of how PPPs are trying to shape the food system.</p>

Source: Authors' elaboration, based on literature review.

Table 6. List of publications consulted to extract the larger set of SDGs and targets related to the food system

N	Authors	Title	Year
1	Bock, A.K., Bontoux, L., Rudkin, J.	Concepts for a sustainable EU food system	2022
2	Caron, P., Ferrero y de Loma-Osorio, G., Nabarro, D., Hainzelin, E., Guillou, M., Andersen, I., & Verburg, G.	Food systems for sustainable development: proposals for a profound four-part transformation.	2018
3	ECDPM, IPES-Food	EU trade policy for sustainable food systems	2020
4	European Commission, Group of Chief Scientific Advisors	Towards an EU Sustainable Food System Insights from the social sciences	2019
5	European Commission, Directorate-General for Research and Innovation, Group of Chief Scientific Advisors	Towards a sustainable food system: moving from food as a commodity to food as more of a common good: independent expert report	2020
6	FAO	Developing sustainable food value chains: Guiding principles	2014
7	FAO	Sustainable food systems Concept and framework	2018
8	FAO	Tracking progress on food and agriculture-related SDG indicators 2021: A report on the indicators under FAO custodianship	2021
9	FAO	Transforming agri-food systems. Legislative interventions for improved nutrition and sustainability - Preliminary version for public consultation.	2021
10	FAO., IFAD., UNICEF., WFP., WHO	The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all	2021
11	Galli, F., Prosperi, P., Favilli, E., D'Amico, S., Bartolini, F., & Brunori, G.	How can policy processes remove barriers to sustainable food systems in Europe? Contributing to a policy framework for agri-food transitions	2020
12	Global Panel on Agriculture and Food Systems for Nutrition	Future Food Systems: For people, our planet, and prosperity	2020
13	Hebinck, A., Zurek, M., Achterbosch, T., Forkman, B., Kuijsten, A., Kuiper, M., ... & Leip, A.	A Sustainability Compass for policy navigation to sustainable food systems	2021
14	Herrero, M., Thornton, P. K., Mason-D'Croz, D., Palmer, J., Bodirsky, B. L., Pradhan, P., ... & Rockström, J.	Articulating the effect of food systems innovation on the Sustainable Development Goals	2021
15	Valentini, R., Sievenpiper, J. L., Antonelli, M., & Dembska, K.	Achieving the sustainable development goals through sustainable food systems	2019
16	HLPE	Food losses and waste in the context of sustainable food systems	2014
17	HLPE	Multi-stakeholder partnerships to finance and improve food security and nutrition in the framework of the 2030 Agenda	2018
18	HLPE	Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition	2019
19	HLPE	Food security and nutrition: building a global narrative towards 2030	2020
20	IPES-Food	THE NEW SCIENCE OF SUSTAINABLE FOOD SYSTEMS: Overcoming Barriers to Food Systems Reform	2015
21	IPES-Food	Breaking away from industrial food and farming systems: Seven case studies of agroecological transition. Case study 2	2018
22	IPES-Food	Towards a common food policy for the European Union. The policy reform and realignment that is required to build sustainable food systems in Europe	2019
23	IPES-Food., ETC Group.	A Long Food Movement: Transforming Food Systems by 2045	2021

24	Jacob-John, J., D'Souza, C., Marjoribanks, T., & Singaraju, S.	Synergistic Interactions of SDGs in Food Supply Chains: A Review of Responsible Consumption and Production	2021
25	JRC	Knowledge Review: Sustainable Food Systems	2021
26	Kretschmer, S., & Kahl, J.	Sustainable Development Goal Drivers in Food Systems	2021
27	Pradhan, P., Sapkota, T. B., & Kropp, J. P.	Why food systems transformation is crucial for achieving the SDGs	2021
28	Roversi, S., Laricchia, C., & Lombardi, M.	Sustainable development goals and agro-food system: The case study of the future food institute	2020
29	SAPEA	A sustainable food system for the European Union	2020
30	T4F - Training for Food	Training for sustainable food systems development Manual	2018
31	UN, One Planet network Sustainable Food Systems Programme	Towards a Common Understanding of Sustainable Food Systems Key approaches, concepts, and terms	2020

Source: Authors' elaboration.

Annex 2. Methodology and survey for the SDG interlinkages

JRC Interlinkages Database and Tool

The JRC collects, analyses and visualises data on interlinkages in the SDG Interlinkages Tool available in the KnowSDGs Platform³. A structured literature review, including both grey literature and peer-reviewed publications, underlies the Tool and its database (Fronza et al., 2023). This review allowed to manually screen and select a pool of 92 documents, published from January 2015 to August 2022, which contain information on interlinkages. From these publications, SDG Interlinkages were collected through an extensive qualitative review. The wealth of information on SDG interlinkages and the level of granularity captured in the database makes it a valuable source for analysing the cascading impacts of food system policies on SDGs.

For the purpose of this analysis, interlinkages with a clear directionality were selected from the database. Considering clearly directed interlinkages is crucial to capture and understand the possible cascading and second-order effects of the impact of a policy option beyond the SDG targets it directly influences. For each interlinkage, information on the type, directionality and description was retained.

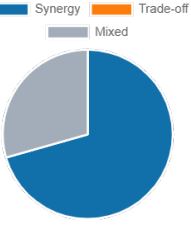
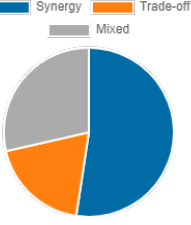
EU Survey on selected interlinkages

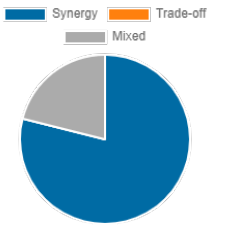
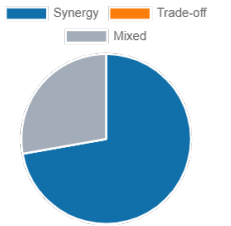
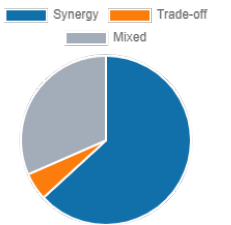
The broad knowledge collected through the JRC Interlinkages Tool was integrated and contextualized for the EU food system with a consultation of experts working in different Directorate-Generals of the European Commission (AGRI, EMPL, JRC, SANTE, ESTAT, MARE, ENV, INTPA, RTD, TAXUD). A dedicated survey allowed to collect experts' assessment on SDGs interlinkages in the context of an EU sustainable food system. The subset of interlinkages proposed in the survey was selected based on the extensive literature review described above. Respondents were asked to validate the relevance of the selected interlinkages in the EU food system on a scale from 0 (not relevant) to 5 (extremely relevant), and to determine the type of interaction between the source target and its destination (synergy, trade-off, mixed). Respondents were also prompted to add a text description contextualizing the interlinkages in the EU. All the selected interlinkages were confirmed by the pool of experts, and concrete examples of how the interlinkages play out in the EU were provided. Their responses are aggregated in Table 7.

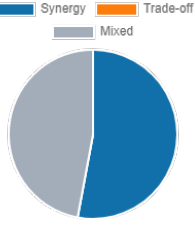
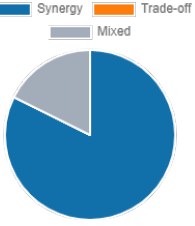
Table 7. Interlinkages in the EU food system, identified by experts' consultation

Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
SDG 2: Zero hunger			
2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round	1.2 by 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions		<p>Access to food for the poor and end malnutrition are crucial for poverty alleviation.</p> <p>Enhancing diets and improving nutritional outcomes of a population is important to break the intergenerational cycle of poverty and at the same time generate accelerated shared economic growth (International Council for Science, 2017).</p> <p>Reduced poverty, social deprivation and social exclusion will result in reduced labour rights abuses, such as child labour, forced labour. This issue is connected to human rights due diligence in EU supply chains.</p>

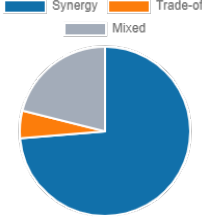
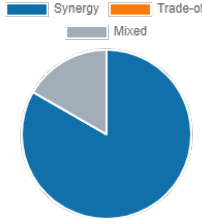
³The interactive tool can be consulted at <https://knowsdgs.jrc.ec.europa.eu/intro-interlinkages>.

Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
<p>2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons</p>	<p>3.2 By 2030, end preventable deaths of children under 5 newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births</p>		<p>Preventing malnutrition and hunger, which we find to be closely connected to deaths of newborns and children, must be tackled. For that purpose, we need to highlight that the global food system prioritizes luxurious and resource demanding foods such as meat and dairy over staple foods for poorer regions such as vegetables and legumes. Considering the rising number of people living on our planet, it is imperative that the rich regions, including the EU, shift their production towards one that safeguards a more equitable allocation of resources.</p>
<p>2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment</p>	<p>6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity</p>		<p>Increased efficiency and productivity simultaneously mean less water consumption per unit of product and higher income for the primary producer.</p> <p>More efficient water use, the lower the risk for water deficiency is and more areas of crops can be irrigated.</p> <p>Doubling the production is not so much needed in EU context. Instead, we should be sustainable for example in reducing food waste as more food wasted equals to more water which is wasted.</p> <p>Change in production system & products is needed rather than increased overall production.</p> <p>A sustainable EU food system would also look at the external effects of EU food system policy including on small farmers and fishers in developing countries.</p> <p>Target 2.3 can counteract target 6.4 due to the difficulty in increasing the agricultural productivity and the water availability at the same time.</p> <p>Agricultural production should definitely move from intensive production towards local small-scale production. However, that should be accompanied by focusing the production mainly on sustainable and less water-intensive foods (considering that meat and dairy are incredibly water intensive).</p>

Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
<p>2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality</p>	<p>6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes</p>		<p>To ensure sustainable production of food, a diet change is a must, that is a move away from meat and dairy-heavy diets towards more plant-based diets. Considering that animal farming is linked to intensive land use and deforestation as well as nutrient pollution of waters, we find a synergy between these two goals if well-executed.</p> <p>Food production will always have a certain impact, but if it concerns a sustainable system, the negative impact will be minimal and synergies can be found.</p> <p>Sustainable resilient food systems are based on lower inputs, which translates into -lower losses.</p> <p>By having sustainable food system we would naturally protect waters wetlands.</p> <p>Freshwater ecosystem is key to provide water for food production.</p>
<p>2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge</p>	<p>15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed</p>		<p>Genetic diversity is key to have a more resilient food production system. This is of utmost relevance in shocks, such as climate change effects.</p> <p>Maintaining and sharing are both important but don't go necessarily together.</p> <p>The synergy could be strengthened by promoting research on genetics and the dissemination / exploitation of research results.</p> <p>A sustainable EU food system would also look at the external effects of EU food system policy, including on genetic diversity of seeds.</p> <p>In EU we have so many forgotten crops; we concentrate on 5 world staple foods while we have so many 'old' crops that we simply do not utilise and that is why we are so dependent.</p>
<p>SDG 3: Good health and well-being</p>			
<p>3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being</p>	<p>8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value</p>		<p>We can only observe an indirect link.</p> <p>Malnutrition, particularly obesity, is a major reason for NCDs and a significant issue in the EU.</p> <p>Non-communicable diseases are closely linked to unsuitable lifestyle and bad diets. Diets heavy in meats and dairy play a role in this, as we need to encourage and educate the public as well as making healthy diets affordable.</p> <p>Connected to international labour standards on safety and health in EU food supply chains, and connected to human rights worldwide, specifically labour rights, including Child Labour (most common in the agricultural sector).</p>

Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
<p>3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination</p>	<p>1.5 by 2030 build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters</p>		<p>The poor and most vulnerable are more exposed to cheap unhealthy food and suffer more from non-communicable disease.</p> <p>Studies have shown how food purchases change following sudden increases in food prices. These found that households have on average bought less fruit and vegetables and switched to cheaper foods which tend to be calorie-dense, nutrient-poor foods. If there are no affordable and sustainable alternatives available, vulnerable households are more exposed to cheap food options which more often include hazardous chemicals. Vulnerable groups and groups with lower socio-economic status are more exposed to air pollution, lack of sanitation and water quality as well as noise pollution.</p> <p>The F2F target on pesticide reduction, including the most hazardous ones, will contribute to the achievement of the SDGs, but more needs to be done to reduce the use of hazardous pesticides in developing countries.</p> <p>Building the resilience of the poor in the light of the accelerating climate change is crucial. However, priority should be given to slowing down climate change altogether, i.e. tackling the most polluting industries, that is fossil fuel industry and animal farming. The latter is also linked to water, air and soil pollution (e.g. from nutrients), giving these two targets a common subject.</p>
<p>SDG 4: Quality education</p>			
<p>4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development</p>	<p>12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature</p>		<p>New opportunities for skills, reskilling, education and training are key to transition to a sustainable agri-food system as highlighted by the creation of the Skills Partnership in the agrifood system in the framework of the European Skills Pact. In order for citizens to make sustainable food choices, there is a need to build environmental awareness. However, awareness solely is not enough; in order to facilitate sustainable food choices, it must be accompanied by legislative frameworks.</p> <p>Education/awareness raising has a huge potential in creating the demand for sustainable food.</p> <p>There is an alarming lack of education and awareness regarding sustainability, which we can assume prevents bigger uptake of healthier and more sustainable diets. Education on sustainable lifestyle should begin at schools and should be based on science and future-proof solutions, rather than traditions or habits. Information can also be conveyed via labelling</p>

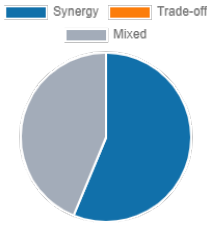
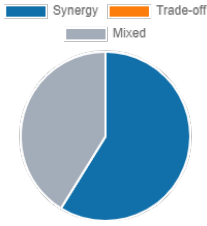
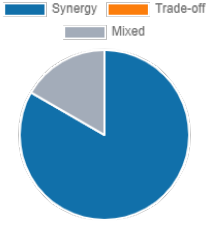
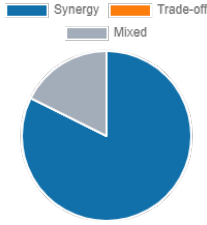
Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
			schemes, but those need to be well executed and mandatory to have a desirable impact.
SDG 6: Clean water and sanitation			
6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination		<p>The synergy could be strengthened by promoting the public management of water resources.</p> <p>The F2F targets on pesticides, nutrient losses and AMR will contribute to achieving the targets.</p>
6.6 By 2020, protect and restore water-related ecosystems , including mountains, forests, wetlands, rivers, aquifers and lakes	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries		<p>Protection and restoration of water-related ecosystems is the basis for future food security. Protecting one ensures resilience of the other.</p> <p>The more ecosystems are restored, the higher the capacity to react to shocks, including climate change.</p>
SDG 8: Decent work and economic growth			
8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally		<p>Produce more efficiently food will reduce negative impact on water quality.</p> <p>Higher economic productivity through intensified agricultural practices can lead to trade-offs with social and environmental goals and targets due to higher pressures on natural ecosystems (water, air and soil). Innovative sustainable farming practices (including organic farming, agro-ecology and regenerative methods such as permaculture) play a key role to reduce environmental pressures. These practices might have lower yields and short-term economic output however increase the resilience of the food system against environmental and socio-economic shocks, which can positively impact food security and stability of production in the long-term. Innovations and technological upgrading which solely increase economic output may fall short on social and environmental targets. In the global context, there might some potential for sustainable intensification through measures such as crop rotation however yet again sole focus on intensifying productivity will reduce resilience and supporting ecosystem services over time.</p> <p>Target 8.2 can counteract target 6.3 due to the difficulty in increasing the economic productivity and the water quality at the same time.</p> <p>Dependent on the sustainability of the actions taken to achieve higher levels of economic productivity.</p>

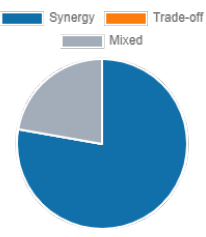
Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
			<p>a) Higher productivity and technology use can backfire, as shown by the current food system. b) Higher productivity through technology can improve water quality c) But current situation can also be improved through traditional knowledge which avoids technology and not necessarily increases productivity.</p>
<p>8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services</p>	<p>9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets</p>		<p>According to the FAO, the world's smallholder farmers produce around a third of the world's food, therefore it is particularly important to support small-scale farmers and farming enterprises.</p>
<p>8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value</p>	<p>1.5 by 2030 build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters</p>		<p>It is essential for the success of the recovery and the transition to ensure a sustainable livelihood for primary producers, who still lag behind in terms of income. For example, the average EU farmer currently earns around half of the average worker in the economy as a whole. Furthermore, gender inequalities are persistent in Europe's agriculture sector. According to Eurostat, 29% of EU farms are led by women with large regional difference (45% in Latvia and Lithuania while only 5% in the Netherlands). Traditional gender roles and discrimination are persistent in the EU food system, while women are more often leading sustainable agriculture and food practices. The EU agrifood system also faces challenges linked to an ageing workforce and to attracting staff with high-level skills, but also a long-term trend towards automation and other productivity rising measures; thus, ensuring decent work opportunities as well as training and skills for young people are essential. Poor and vulnerable households are also most affected by socio-economic shocks such as increases in food prices, which weigh particularly on the most vulnerable households who have to spend a higher share of their disposable income on basic goods, such as energy and food.</p>

Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	16.6 Develop effective, accountable and transparent institutions at all levels		<p>The agri-food ecosystem often relies on temporary contracts and precarious employment in particular due to seasonality of much of agricultural production (e.g. agricultural seasonal workers especially women from developing countries). In the transition toward a more sustainable food system, it is key to ensure the protection of labour rights. Effective governance and transparent institutions are important to tackle informality and precarious employment as well as legal migration for agricultural workers.</p> <p>The CAP's newly introduced social objective on safeguarding working conditions and protecting workers' rights will help implementing this target.</p>
SDG 12: Responsible consumption and production			
12.2 By 2030, achieve the sustainable management and efficient use of natural resources	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally		<p>The more sustainable the practice, the lower the pressure on the environment.</p> <p>In food production, focus should be shifted towards those foods that use an efficient amount of resources while providing nutrients and health benefits. As of now, the EU agricultural system focuses on the complete opposite that is funding the unsustainable use of resources in meat and dairy production.</p>
12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution		<p>The lower the demand for food production due to more efficient use of food produced, the lower the pressure on the environment.</p> <p>Reduction of food losses and waste is one of the F2F objectives, as it is too high and has a negative impact on productivity, environment and climate.</p> <p>While food waste is a crucial issue to tackle, the production of meat, dairy and eggs lead to bigger calorie loss than all the global food waste. This should be taken into account as well. At the same time, the EU should prevent overproduction of those foods where large food waste occurs.</p>
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous		<p>The lower the demand for food production due to more efficient use of food produced, the lower the pressure on the environment.</p> <p>Reduction of food losses and waste is one of the F2F objectives, as it is too high and has a negative impact on productivity, environment and climate.</p>

Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
	chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally		
12.6 Encourage companies , especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally		<p>Better information in reporting can support the identification of environmental hotspots and needed actions.</p> <p>Maybe 'encouraging' is not sufficient.</p>
12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities	6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity		<p>Public procurement in relation with food based dietary guidelines that fully account for sustainability aspects is important for public catering.</p> <p>Public procurement promotes sustainable consumption, however no mandatory criteria exist related to water use. There is GPP criteria on "Best practices to minimise energy and water consumption" but, as all GPP criteria, it is not mandatory.</p> <p>Regarding public procurement and food, public money should always be directed towards foods that are sustainable and resource-effective, which is currently not the case. We consider this to be a low-hanging fruit.</p>
SDG 13: Climate action			
13.2 Integrate climate change measures into national policies, strategies and planning	8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation , in accordance with the 10-Year Framework of Programmes on		<p>To feed the world, more food has to be produced. At the same time the produced food must have a lower climate impact.</p> <p>The decrease of any environmental impact through specific measure can support decoupling growth from impact. However, the overall impact depends also on the consumption intensity and it should also be addressed.</p> <p>Climate change (very often) leads to environmental degradation.</p>

Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
	Sustainable Consumption and Production, with developed countries taking the lead		
SDG 14: Life below water			
14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality		<p>Reducing marine pollution can positively affect the production of seafood.</p> <p>Unsustainable practices in fisheries and aquaculture contribute to marine pollution (e.g. discarded nets). For some stocks and sea basins, the current scale of fishing is beyond sustainable.</p> <p>The reduction of nutrient-based eutrophication and contaminant pollution (including plastics) will benefit both the sustainability of land and marine based food production.</p>
14.4 By 2020, effectively regulate harvesting and end overfishing , illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	12.2 By 2030, achieve the sustainable management and efficient use of natural resources		<p>There is a clear synergy between the two targets. Overfishing and destructive fishing practices need to be effectively tackled. The ocean absorbs a large amount of carbon from the atmosphere needs to be protected.</p> <p>Overfishing leads to lower fishing yields than expected from sustainable fishing.</p>

Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	1.5 by 2030 build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters		Marine Protected Areas (MPA) shall help in the mid-term to increase fishing yields (spillover effect), preventing overfishing and increasing the diversity of economic activities (e.g., tourism), while MPAs implementation may restrict in the short-term fishing activities.
14.3 Minimize and address the impacts of ocean acidification , including through enhanced scientific cooperation at all levels	1.5 by 2030 build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters		Only a substantial reduction of CO2 emissions will practically limit the ocean acidification, and impact on coastal communities is limited.
SDG 15: Life on land			
15.1 By 2020, ensure the conservation , restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	6.6 By 2020, protect and restore water-related ecosystems , including mountains, forests, wetlands, rivers, aquifers and lakes		First goal of food systems is producing food, without disturbing ecosystems. Improving ecosystem conditions can positively affect food production.
15.3 By 2030, combat desertification, restore degraded land and soil , including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to		A large portion of the EU soils need to be restored, as outlined in the EU soil strategy. Improving ecosystem conditions can support the deployment of resilient agriculture, which can in turn improve ecosystems quality. It is crucial that agriculture embraces futureproof practices. We need to once again highlight the role of animal farming, especially how resource intensive and wasteful it is. Considering that more calories are lost in animal farming than all the food waste combined, we need to start using resources wisely and shift production towards foods that are healthy and nutritious, environmentally friendly and ethical.

Target A (source)	Target B (destination)	Type	Contextualization in EU Food System
	climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality		
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries		<p>Less degraded ecosystems can better respond to climate change shocks.</p> <p>One of the biggest drivers of biodiversity loss is animal farming, mainly due to deforestation of land to produce feed and clear land for grazing. Protection of habitats and species cannot be addressed without addressing this industry.</p>
Others			
1.2 by 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	8.7 Take immediate and effective measures to eradicate forced labour , end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms	Synergy	<p>Reduced poverty, social deprivation and social exclusion will result in reduced attractiveness of labour rights abuses, such as child labour, forced labour. Connected to human rights due diligence in EU supply chains.</p> <p>EU has committed to keeping its supply chains free of child labour (Strategy on the rights of the child). EU has a zero-tolerance on child labour and works to eliminate it. EU new initiatives to tackle products of forced labour (including forced child labour) exist.</p>
8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors	8.7 Take immediate and effective measures to eradicate forced labour , end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms	Synergy	<p>Increased productivity and modernisation will reduce the attractiveness of labour abusive practices. E.g. labour-saving tech and machinery can have a great effect on reducing child labour. This is important for EU supply chains. As per the EU strategy on the rights of the Child, the EU is committed to making its supply chains free of child labour. Child labour prevalence is high in agri supply chains.</p>

Source: Authors' elaboration from the experts' consultation.

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