

Shaping the future of food research and innovation

Insights and recommendations from **Food 2030** Experts



Shaping the future of food research and innovation: Insights and recommendations from Food 2030 experts

European Commission
Directorate-General for Research and Innovation
Directorate B – Healthy Planet
Unit B.2 – Bioeconomy and Food Systems
Contact Rosalinda Scalia
Email RTD-FOOD2030@ec.europa.eu
Rosalinda.SCALIA@ec.europa.eu
RTD-PUBLICATIONS@ec.europa.eu

European Commission
B-1049 Brussels

Manuscript completed in June 2025
1st edition

The contents of this publication do not necessarily reflect the position or opinion of the European Commission.

PDF	ISBN: 978-92-68-27585-6	doi: 10.2777/8711448	KI-01-25-117-EN-N
-----	-------------------------	----------------------	-------------------

Luxembourg: Publications Office of the European Union, 2025

© European Union, 2025



The Commission's reuse policy is implemented under Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39, ELI: <http://data.europa.eu/eli/dec/2011/833/oj>).

Unless otherwise noted, the reuse of this document is authorised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed, provided appropriate credit is given and any changes are indicated.

For any use or reproduction of elements that are not owned by the European Union, permission may need to be sought directly from the respective rightholders. The European Union does not own the copyright in relation to the following elements:

cover: © vaaseenaa #239171637, 2025. Source: stock.adobe.com

Shaping the future of food research and innovation

Insights and recommendations from Food 2030 experts

Authored by Jessica Duncan, horizontal rapporteur

On the basis of the independent expert reporting of:

Roberta Sonnino, Pathway 1 “Governance for food system change”; Pathway 2 “Urban food system transformation”

Katerina Moutou, Pathway 3 “Food from the oceans and freshwater resources”

Anet Režek Jambrak, Pathway 4 “Alternative proteins for dietary shift”

Thomas Candeal, Pathway 5 “Food waste and resource efficient food systems”

Emmanuelle Maguin, Pathway 6 “The microbiome world”

Meropi Kontogianni, Pathway 7 “Nutrition and sustainable healthy diets”

Paul Brereton, Pathway 8 “Food safety systems for the future”

David Amudavi, Pathway 9 “Food systems Africa”

George Beers, Pathway 10 “Data and digital transformation”

Contents

Acknowledgements	4
Executive Summary	5
1. Europe needs a strong Food Systems Research and Innovation Agenda.....	7
1.1. Food systems can make or break Europe's priorities	7
1.2. Context for this evaluation: 10 years of Food 2030	7
1.3. Food 2030: A systematic vision for R&I.....	8
1.3.1. EU's Food System R&I landscape.....	8
1.3.2. Understanding Food 2030	9
2. Recommendations.....	12
Recommendation 1: Revise the narrative and theory of change around Food 2030.....	12
Recommendation 2: Adapt and align Food 2030 priorities	13
Recommendation 3: Adapt and align pathways.....	13
Recommendation 4: Define and embed food systems approaches more explicitly across pathways and projects.....	14
Recommendation 5: Strengthen inter and intra-pathway coordination and collaboration to progress Food 2030 priorities	14
Recommendation 6: Continue and enhance multi-actor approaches to R&I for food system transformations	16
Recommendation 7: Ensure structural barriers to transformation are addressed across Food 2030.....	17
Recommendation 8: Strengthen the science-policy-society interface for food systems	17
Recommendation 9: Develop and implement a comprehensive Monitoring and Evaluation framework for Food 2030.....	18
3. Findings.....	19
3.1. Impact: Advancing the priorities of Food 2030	19
3.1.1. Summary of contributions across Food 2030 pathways	22
3.2. Underlying rationale of Food 2030	28
3.2.1. Food system approaches	28
3.2.2. Food 2030 priorities	29
3.2.3. Food 2030 pathways	31

3.2.4.	Collaboration.....	36
3.2.5.	Multi-actor approach	37
4.	Looking ahead.....	40
4.1.	Gaps across Food 2030	40
5.	Conclusions	41
5.1.	Broader framework considerations	41
5.1.1.	Design, implement and incentivise new strategies to improve knowledge and innovation transfer and uptake	41
5.1.2.	Reconsider approaches to funding and end-of-project timelines.....	43
5.1.3.	Strengthen linkages between Food 2030 and other initiatives at EU, National and local levels	44
5.2.	Concluding reflections.....	45
6.	Methods	46
6.1.	Objectives and methods	46
6.2.	Assessing impact.....	47
7.	Appendices.....	48
	Appendix 1 Overview of outputs of the projects by pathway	48
	Appendix 2 Analytic summary of existing and proposed priorities	68
	Appendix 3 Analytic summary of existing pathways	73

Acknowledgements

This report would not exist without the work of the nine independent experts. Therefore, I would like to first acknowledge the contributions and hard work of Roberta Sonnino, Katerina Moutou, Anet Režek Jambrak, Thomas Candéal, Emmanuelle Maguin, Meropi Kontogianni, Paul Brereton, David Amudavi, and George Beers.

I would also like to express my gratitude to the Food 2030 team in the Directorate-General for Research and Innovation for their availability and willingness to answer questions, even the hard ones.

A special acknowledgement and sincere thank you to Chathuranga Hasithi Samarasinghe, whose intellect and evaluation-minded approach was critical in this process. It was also a pleasure to work through ideas together.

Finally, to the project coordinators who took part in interviews and completed surveys, and to the Project Officers in the Research Executive Agency who supported the process: thank you. Your insights and commitment were deeply appreciated.

Jessica Duncan

Expert study horizontal rapporteur



Kick off meeting of experts and Food 2030 Team, 5 February 2025

Executive Summary

Context and strategic vision

Food systems are central to Europe's ambition for a sustainable, competitive, and secure future. Robust Research and Innovation (R&I) is a critical enabler in transforming food systems to contribute effectively to this ambition.

Food 2030 is the R&I framework for advancing sustainable, resilient, inclusive, and healthy food systems. Since its launch in 2016, Food 2030 has pioneered the adoption of a systemic approach to connect, scale up, and boost EU R&I investments and impact with the support of Horizon 2020 and Horizon Europe framework programmes.

Food 2030 adopts a systemic, cross-sectoral R&I approach, operationalised through 11 thematic pathways delivering co-benefits to four priorities: Nutrition for sustainable, affordable and healthy diets; Climate-smart and environmentally sustainable food systems; Circular and resource-efficient food systems; Food systems innovation and empowerment of communities.

Ten years in, this evaluation provides a stock-take of the impact achieved through Food 2030 and forward-looking recommendations to further strengthen Food 2030's contribution to sustainable, resilient, healthy and inclusive food systems across Europe, and beyond.

A systemic approach

Food systems comprise the full set of relations between the elements, activities and actors involved in the planning, production, processing, distribution, consumption, and disposal of food, and the resulting outcomes for health, society, the environment and the economy.

Importantly, food systems are both a driver of systemic challenges — such as climate change, biodiversity loss, and diet-related diseases — and part of transformative solutions. In short, food systems are not just about food: they are strategic levers for achieving the EU's policy priorities.

Overview of the evaluation

This evaluation focused on underlying operational logics and assumptions informing Food 2030 and the resulting impacts. Issues of project implementation, including eligibility criteria, funding amounts, processes, rates of acceptance, budgets and timelines fall under the remit of the Framework Programme and are thus only partly covered in the scope of this evaluation.

The evaluation found that Food 2030 has adopted a number of structural assumptions that have shaped the logic of programming. These include:

1. The importance of collaborative, multi-actor approaches to research and innovation.
2. The role of R&I to foster new insights and impacts along with improved technologies that capitalise on the potential of the digital food environment.
3. The need for sound, harmonised and transparent data and monitoring systems.
4. The value of education, training and awareness-raising to advance the social-ecological transformation.
5. The need for strong linkages between R&I and decision-makers.

The evaluation confirms these assumptions are robust and highly relevant to the goals of Food 2030. The evaluation further concludes that **the underlying rationale, theory of change and intervention logic of Food 2030 have been pioneering**, laying the ground for current debates on systemic and collaborative approaches to R&I for food, and pushing the state-of-the-art on topics including urban food policy, food safety, alternative proteins and the microbiome world. More broadly, the evaluation concludes that **Food 2030 programming has ensured alignment with EU strategic priorities, while maintaining the enabling role of R&I for sustainability and health**.

The evaluation finds that the high-degree of alignment across R&I, policy and society is due to the approach to Programming that utilises co-creation, engaging European Commission services, including the co-chairs of Horizon Europe Cluster 6, but also other relevant Directorate-Generals, as well as member states and stakeholders. In short, **the alignment and adaptive nature of Food 2030 priorities are a result of the bottom-up approach to programming.**

Under Food 2030 programming, **funded projects have advanced the EU R&I agenda**, delivering tangible outcomes across multiple domains. All projects and pathways contribute co-benefits to the four priorities, with particular emphasis on nutrition and empowering communities. **Food 2030 projects have been successful in producing:**

- Scientific publications (particularly the case for Research and Innovation Actions).
- Living Labs and networks.
- Business models for testing and scaling-up innovations.
- Apps and other ICT tools (e.g. dashboards).
- Data sets.
- Toolboxes to support stakeholders, including policy makers and end-users.
- Novel products (e.g. new energy bars; sensors to monitor the growth and physiological state of microalgae in real-time).

Recommendations

A number of opportunities to further strengthen Food 2030 have been identified and are put forward as recommendations.

- **Co-create a stronger narrative and theory of change (ToC)** to enhance the coherence and directionality of Food 2030. A ToC is a structured way of thinking about change by identifying an impact pathway for efforts to reach a logical set of outcomes or impacts based on the experience and expertise of those undertaking efforts. Central to this is a revision of priorities and pathways to support coherence and simplification (Recommendations 1,2,3).
- **Make use of a food systems approach to further align pathways and priorities.** Provide more clarity around what constitutes a food systems approach under Food 2030 and how to effectively operationalise such an approach in a multi-actor context (Recommendation 4).
- Important project results and impacts are not adequately taken up and implemented. **New strategies are required to improve the transfer and uptake of knowledge, tools and other outputs** (i.e. business models, novel products, apps) across projects and into the market (Recommendation 5).
- **Continue to enhance and strengthen multi-actor collaborative R&I.** The multi-actor approach is critical for delivering strong outcomes and impact. It is recommended to strengthen mechanisms and methods to ensure all stakeholders are meaningfully engaged, particularly underserved and marginalised communities. At the same time, it is crucial to streamline stakeholder engagement to avoid stakeholder fatigue (Recommendation 6).
- **Devote greater attention to addressing power asymmetries and structural lock-ins** that hinder system transformation (Recommendation 7).
- **Strengthen linkages between R&I projects and EU policy-making processes** to ensure timely integration of insights and innovations (Recommendation 8).
- **Design and implement a targeted monitoring and evaluation framework** to capture the full impact of Food 2030 (Recommendation 9).

Conclusion

Food 2030 is evaluated as an effective instrument for not only driving R&I in support of the EU's food system priorities, but also advancing the broader priorities of a green transition, competitiveness, security and resilience, and simplification. Looking ahead, a reinforced and adaptive R&I framework will remain crucial. With strategic refinements, Food 2030 should continue to act as a flagship programme, connecting research, innovation, investment, and policy for a sustainable, inclusive, and resilient European food future.

1. Europe needs a strong Food Systems Research and Innovation Agenda

1.1. Food systems can make or break Europe's priorities

*'Food systems present many opportunities – many hardly yet tried... The potential is enormous and provides much cause for optimism.'*¹

Food systems are at the core of the European Commission's priorities of sustainability, competitiveness, and security. A robust Research and Innovation (R&I) framework for food systems is thus critical to securing these priorities.

Food systems comprise the full set of relations between the elements, activities and actors involved in the planning, production, processing, distribution, consumption, and disposal of food, and the resulting outcomes for health, society, the environment and the economy.²

A food systems approach offers a holistic perspective by focusing on not only how elements within a food system interact and produce outcomes, but also how the food system interacts with other systems (i.e. ecological, economic, political).

In this way, a food systems approach broadens 'the focus of researchers and policy makers from the activities in the food system to the food security, social and environmental outcomes and the socio-economic and environmental drivers of these food system activities.'³ This is critical to support the urgent need for transformation.

Our food systems are broken; they are key accelerators of environmental degradation and a major factor in exceeding planetary boundaries. Yet, **transforming food systems is a complex process** that demands strategic, creative, and adaptable R&I frameworks supported by an enabling regulatory environment. It also requires changing material flows, the rules and goals of systems, distribution of power, and, perhaps most challenging, the mindset or paradigms informing current systems.⁴

1.2. Context for this evaluation: 10 years of Food 2030

In October 2015, at the Milan World Expo on *Feeding the Planet, Energy for Life*, the European Commission called for a more ambitious role for R&I and announced an intention to launch a 'Food Research Area'. The following year, the first Food 2030 conference was organised, thanks to the dedication and vision of Director John Bell and Karen Fabbri, from the Directorate-General for Research and Innovation.

Since this moment, the European Commission has taken steps towards **adopting a R&I framework for food systems transformation to tackle complex societal challenges that**

¹ GLOPAN, "Food Systems and Diets: Facing the Challenges of the 21st Century" (London, UK: Global Panel on Agriculture and Food Systems for Nutrition, 2016), 28, <https://glopan.org/sites/default/files/ForesightReport.pdf>.

² Monika Zurek et al., "Assessing Sustainable Food and Nutrition Security of the EU Food System—An Integrated Approach," *Sustainability* 10, no. 11 (November 2018): 4271, <https://doi.org/10.3390/su10114271>.

³ Just Dengerink and Herman Brouwer, "Food System Models and Methodologies within Wageningen University & Research: Opportunities for Deepening Our Food Systems Work" (Wageningen: Wageningen Centre for Development Innovation, 2020), 4, <https://doi.org/10.18174/516691>.

⁴ Donn Meadows, "Leverage Points: Places to in a System" (Hartland, VT: The Sustainability , 1999), https://donellameadows.org/wp-content/userfiles/Leverage_Points.pdf.

cannot be solved by any EU Member State alone, and that require overcoming disciplinary, sectoral, institutional and regulatory silos.

Ten years later, it is important to take stock and reflect on the direction of Food 2030 for the next five years and beyond. Towards this end, this evaluation undertook to:

- Assess the underlying rationale and structure of Food 2030;
- Evaluate the output and impact produced by Food 2030, including the value-added for the EU; and,
- Identify potential gaps and synergies to be addressed by EU research and innovation policy on food systems.

This report synthesises and builds on the independent evaluations of 10 of the Food 2030 pathways. Pathways are specific domains identified as key levers of change where R&I can have deep and multiple impacts. The Pathway on “Zero Pollution food systems” was officially introduced in 2023 and did not form part of the evaluation, as projects funded under this pathway are not mature enough to draw conclusions on their impact. Pathways 1 and 2: Governance for Food System Change and Urban Food System Transformation have been assessed jointly due to their complementary nature.

The synthesis of these independent evaluations led to the identification and **elaboration of nine targeted and actionable recommendations**.

In what follows, a brief overview of Food 2030 is presented, followed by the nine actionable recommendations. These are supported by an elaboration of findings targeting:

- Output and impact;
- The underlying rationale of Food 2030, including the food systems approach, priorities and pathways;
- Collaboration and the multi-actor approach;
- General research gaps to inform future programming; and,
- Considerations beyond Food 2030.

1.3. Food 2030: A systematic vision for R&I

1.3.1. EU’s Food System R&I landscape

Food systems R&I at the EU-level makes good use of the Horizon Europe multiannual EU framework programme⁵ to enable top-down and bottom-up R&I activities. Horizon Europe covers 2021–2027, but builds on preceding framework programmes.

Horizon Europe is structured around three pillars. Pillar II focuses on science and technologies to address major global challenges, also supporting the UN’s Sustainable Development Goals (SDGs). As such, there is a focus on improving people’s lives and protecting the planet for future generations.

Simultaneously, Pillar II supports ‘the creation and better diffusion of high-quality new knowledge, technologies and sustainable solutions, reinforces the European industrial competitiveness, strengthens the impact of R&I in developing, supporting and implementing

⁵ https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

Union policies, and supports the uptake of innovative solutions in industry, in particular in SMEs and start-ups, and society to address global challenges'.⁶

Pillar II is organised into six clusters. Food 2030 falls under Cluster 6: Food, Bioeconomy, Natural Resources, Agriculture and Environment. Figure 1 provides an overview of the landscape as of November 2023. For an elaboration of Food Systems in the R&I landscape, see the report *Food 2030 Research and Innovation: Pathways for action 2.0*.⁷

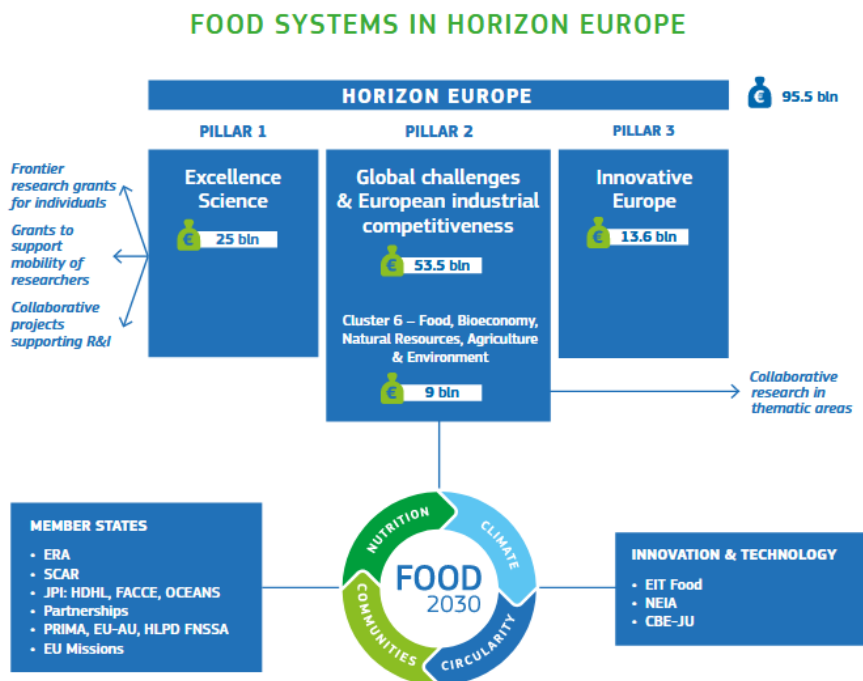


Figure 1 Funding and governance of the EU's food-system-related R&I, 2021-2027

1.3.2. Understanding Food 2030

Food 2030 is the R&I framework supporting the transition towards sustainable, healthy and inclusive food systems. Food 2030 is underpinned by the need to foster a multi-actor and

⁶ Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013, <http://data.europa.eu/eli/reg/2021/695/2024-03-01>

⁷ European Commission: Directorate-General for Research and Innovation, Bizzo, G., Fabbri, K., Gajdzinska, M., Haentjens, W. et al., Food 2030 – Pathways for action 2.0 – R&I policy as a driver for sustainable, healthy, climate resilient and inclusive food systems, Publications Office of the European Union, 2023, <https://data.europa.eu/doi/10.2777/365011>. Note CBE JU, Circular Bio-based Europe joint undertaking; EIT, European Institute of Innovation and Technology; EU-AU HLPD, African Union–EU High-Level Policy Dialogue; FACCE, joint programming initiative on agriculture, food security and climate change; FNSSA, food and nutrition security and sustainable agriculture; HDHL, Healthy diet, healthy life; JPIs, joint programming initiatives; NEIA, new European innovation agenda; Oceans, healthy and productive seas and oceans; PRIMA, Partnership for Research and Innovation in the Mediterranean Area; SCAR, Standing Committee on Agricultural Research.

systemic approach to R&I capable of delivering co-benefits for people's health, the climate, the planet and communities.

Food 2030 provides guidance to programming EU R&I funding under Horizon Europe. For example, one function is to **develop an R&I policy agenda that translates into Horizon Europe's multiannual calls for proposals**. Food 2030 is also expected to deliver on issues linked to the renewed European research area (ERA) policy priorities and the EU Circular and Sustainable Bioeconomy Strategy and Action Plan.

Food 2030 programming also serves as a guide for the FutureFoodS partnership,⁸ a public-public partnership co-funded by the European Commission within the Horizon Europe Framework Programme. The overall mission of FutureFoodS is to mobilise research and innovation in Europe to accelerate the transition from linear food chains towards circular food systems that function within planetary boundaries. This partnership is further guided by a Strategic Research and Innovation Agenda (SRIA). Food 2030 helps in aligning its annual work plans to seek complementarities, exchange findings and avoid overlap. In turn, the Partnership also feeds into Food 2030.

Food 2030 acts as a convening platform and a process to facilitate R&I. It adopts a systemic approach to enhance EU R&I and investment to deliver co-benefits related four overarching priorities:

1. Nutrition for sustainable, affordable and healthy diets.
2. Climate-smart and environmentally sustainable food systems.
3. Circular and resource-efficient food systems.
4. Food systems innovation and empowerment of communities.

Through various workshops and conferences involving stakeholders, a bottom-up approach was used to define 11 pathways. These pathways serve as crucial tools for creating impact and are implemented by supporting a wide range of projects and initiatives both in Europe and internationally. This is achieved by engaging Member States and countries associated with the Horizon Europe programme, as well as collaborating with international partners. The pathways are:

1. Governance for food systems change
2. Urban food systems transformations
3. Food from the ocean and freshwater resources
4. Alternative proteins for dietary shifts
5. Food waste and resource-efficient food systems
6. The microbiome world
7. Nutrition and sustainable healthy diets
8. Food safety systems of the future
9. Food systems Africa
10. Data and digital transformation
11. Zero-pollution food systems

Food 2030 has a focus on post-farm-gate challenges and food system governance. As such, the pathways do not cover every relevant thematic area requiring R&I investment. For example:

sustainable agriculture, healthy soil, agroecology, alternative pesticides, rural growth, precision farming, health and well-being, biotechnology, combating biodiversity loss, integrated water management, circular bioeconomy, cultural

⁸ <https://www.futurefoodspartnership.eu/>

heritage and rural development aspects, are also dealt with by other, complementary, Horizon Europe work streams.⁹

The evaluation finds that the high-degree of alignment across R&I, policy and society is due, to a very high degree, to the specific approach to Programming. This co-creation approach involves processes across Commission services, including the co-chairs of Horizon Europe Cluster 6, but also other relevant Directorate-Generals, as well as Member States and stakeholders. In short, **the alignment and adaptive nature of Food 2030 priorities are highly associated with the bottom-up approach to programming.**

⁹ European Commission: Directorate-General for Research and Innovation (2023), 7.

2. Recommendations

Building on the results of the independent evaluation of 10 pathways, the following **recommendations are put forward to support the ambition and vision of Food 2030**, taking into account new challenges and opportunities to achieve its goal of accelerating the transition towards sustainable food systems.

Underlying each recommendation is the explicit recognition of the fundamental urgency and need for this initiative and its positioning within the European R&I landscape.

Recommendation 1: Revise the narrative and theory of change around Food 2030

Why: Narratives play a crucial role in transforming food systems by influencing how problems are framed, which solutions are considered, and ultimately, what actions are taken. Narratives shape public understanding, guide policy decisions, and impact the behavior of various stakeholders.¹⁰ The narrative around Food 2030, including the vision for advancing food system transformations, while pioneering, can be made more coherent, explicit and impactful.

Given the transformative vision underpinning Food 2030, **more attention can be devoted to how change is expected to happen**. A Theory of Change (ToC) is helpful here. A ToC is a structured way of thinking about how and why an intervention or programme is expected to lead to desired outcomes. A ToC sets out an impact pathway for efforts to reach a logical set of outcomes or impacts based on the experience and expertise of those undertaking efforts.¹¹ A revised ToC could better clarify how R&I activities, coordinated under Food 2030 are expected to lead to desired changes.

How: This recommendation can be advanced by:

- a. Continuing to facilitate collaborative, bottom-up processes to feed into the narrative and ToC for Food 2030. Attention to engaging under-represented stakeholders is critical.
- b. Shifting focus. At the level of programming, much attention is paid to what to fund and what impacts to target. Less attention is paid to what can accelerate change. This requires an explicit identification of what changes are needed and when, supported by a systems approach.
- c. Ensuring flexibility and adaptability are built into the ToC. The ToC should foster, not restrict, innovation. The ToC must be responsive to changing contexts and advancements in knowledge (i.e., advancements in biotechnology, AI, war and conflicts, changing geopolitical realities, climate).
- c. Clarifying how outputs (including Living Labs, Lighthouses, networks, tools, data sets, scientific publications, etc.) developed across Food 2030 projects are to be taken-up and used by proceeding projects to progress change. This is a critical element of a ToC and important for reducing duplication between projects.
- d. Clearly communicating the revised narrative and ToC for Food 2030 to relevant actors. Awareness of Food 2030 is low, even among project actors. Project participants can receive more targeted explanations of how Food 2030 is organised, why this is relevant for them and the impact of their project, and how projects are expected to progress the pathways.
- e. Reconsidering the priorities and pathways to ensure alignment. Proposals for revising priorities and pathways are elaborated in section 3.2.

¹⁰ SAPEA, Science Advice for Policy by European Academies. (2020). A sustainable food system for the European Union. Berlin: SAPEA. <https://scientificadvice.eu/advice/a-sustainable-food-system-for-the-european-union/>.

¹¹ Dhanush Dinesh et al., "Enacting Theories of Change for Food Systems Transformation under Climate Change," *Global Food Security* 31 (December 1, 2021): 100583, <https://doi.org/10.1016/j.gfs.2021.100583>.

- f. Such an exercise could build on existing efforts, including, but not limited to:
- Report of the 5th SCAR Foresight exercise.¹²
 - Report of JRC on *Delivering on EU Food Safety and Nutrition in 2050*.¹³

Recommendation 2: Adapt and align Food 2030 priorities

Why: While the four key priorities remain relevant, there are opportunities to enhance alignment, reduce overlap and clarify associated criteria. There are also opportunities to better align the priorities with food system approaches (see section 3.2.1).

How: This recommendation can be advanced by:

- a. Reviewing existing priorities and assessing overall alignment and coherence. Here it is important to recognise both **internal coherence** (i.e. pathways and priorities) and **external coherence** (e.g. wider policy goals, including SDGs, CAP, Committee on World Food Security (CFS), UN Food and Agriculture Organisation (FAO), UN Food Systems Summit (UNFSS)).
- b. Considering the priorities through the lens of a food systems framework, which could involve reframing priorities as outcomes. This could strengthen the overall Food2030 narrative. Considering that pathways are also prioritised in Food 2030 for their potential impact (see section 3.2.2), what constitutes a priority is not always clear.
- c. Ensuring that priorities (or outcomes) are not overly prescriptive or narrow in ways that could limit innovation and impact.
- d. Centering the urgency of the climate crisis and social inequalities in the articulation of the priorities.

More concrete proposals are outlined in Section 3.2.2 and Appendix 2.

Recommendation 3: Adapt and align pathways

Why: In the logic of Food 2030 programming, pathways are the thematic levers of change: if the priorities reflect the what (i.e. what changes we desire, what we prioritise), the pathways represent the how (i.e. how do we get there). The evaluation finds that pathways (including titles and descriptions) can be more coherent, cohesive and clear.

How: This recommendation can be advanced by:

- a. Revising pathway titles and descriptions so they are aligned in their messaging. At present, the titles are either descriptive or directional. Having standardised titles can support the narrative around the role and function of the pathways in achieving the goals of Food 2030.
- b. Considering the pathways through the lens of a food systems framework (see section 3.2.1).
- c. Positioning Pathway 1 Governance for food system change and Pathway 10 Data and digital transformation as triggers or accelerators of systems change. This would align with common food system approaches (see section 3.2.1).
- d. Reducing overlap between pathways (e.g. between Pathway 1 Governance for food system change and Pathway 2 Urban food system transformation).

¹² European Commission: Directorate-General for Research and Innovation, *Resilience and transformation – Report of the 5th SCAR Foresight exercise expert group – Natural resources and food systems – Transitions towards a ‘safe and just’ operating space*, Publications Office of the European Union, 2020, <https://data.europa.eu/doi/10.2777/025150>.

¹³ Joint Research Centre: Institute for Reference Materials and Measurements, Mylona, K., Ulberth, F., Maragkoudakis, P., Bock, A.-K. et al., *Delivering on EU food safety and nutrition in 2050 – Future challenges and policy preparedness*, Publications Office, 2016, <https://data.europa.eu/doi/10.2787/625130>.

- e. Reducing the number of pathways to simplify programming. For example, Pathway 4 Alternative proteins for dietary shift, could be captured under Pathway 7 Nutrition and sustainable healthy diets, so long as attention to alternative proteins is not lost.

Recommendation 4: Define and embed food systems approaches more explicitly across pathways and projects

Why: A systems-based, inclusive, and strategically-connected funding approach is essential to transform Europe's food and agricultural systems in ways that are environmentally sustainable and equitable. **A competitive and sustainable Europe needs systems thinkers.** Across Food 2030 programming, a lack of systems knowledge is experienced as a source of confusion, a limitation, and a barrier for impact. A transversal food systems approach can facilitate more efficient and effective collaboration and align insights from across pathways. This, in turn, can enable more efficient cross-pathway communication, collaboration and uptake of Food 2030 outputs.

How: This recommendation can be advanced by:

- a. Implementing training and capacity-building activities on system thinking, and entrepreneurship. The FossNet project, for example, is developing curricula for food systems science literacy. This could be a starting point to develop a shared understanding of key concepts.

Note that a common understanding of concepts does not suggest consensus. Given differences in disciplines, values and worldviews, as well as advancements in R&I, adequate space should be made for diverse (but still clearly defined) definitions of key concepts and associated frameworks.

- b. Enhancing linkages to the Standing Committee on Agricultural Research (SCAR) Food Systems Working Group and the FutureFoodS Partnership to facilitate alignment and advance the state-of-the-art.
- c. Including more systemic criteria in the evaluation of proposals and projects.
- e. Designing research calls focused on the theoretical elaboration of food systems, as well as other contested and/or complex concepts. These should take into account diverse perspectives (i.e. be transdisciplinary), and assess the limits and intended and unintended consequences of the conceptualisations.

Here, attention should be given to how system approaches are being conceived and whether systems should be studied as a whole, or in a more selected/strategic way that would allow for a more in-depth focused approach. Nexus thinking – an approach that recognises the complex, systemic nature of global and local development issues and the need to integrate data and knowledge, plans and policies – should also be considered. This could be in the form of shorter, smaller, transversal projects.

- f. Framing research calls for proposals around a wider notion of 'sustainable places' might help to connect food with other complex systems that are also governed at multiple scales. This would allow for a more comprehensive understanding of relations between systems (e.g. food systems, energy systems, water systems, etc.).

Recommendation 5: Strengthen inter and intra-pathway coordination and collaboration to progress Food 2030 priorities

Why: The evaluation found that the impact of Food 2030 programming is restricted by limited coordination and collaboration within and across pathways. In practice, relevant networks, outputs, and data are not being taken up or utilised adequately by new projects. Further, many

outputs are not taken up by market actors after the project pilot phase. Despite efforts to introduce work packages to facilitate collaboration, and Coordination and CSAs and clusters to streamline coordination, connections between projects remain predominantly informal and focused on communication and not collaboration and uptake.

How: This recommendation can be advanced by:

- a. Continuing and expanding collaboration meetings with the projects, organised by the Directorate-General for Research and Innovation in collaboration with the European Research Executive Agency (REA). The active and continuous involvement of European Commission Policy Officers in project activities to support knowledge-exchange and learning processes is important. This could also involve joint progress review meetings to identify synergies and opportunities for deeper collaboration, also with other relevant European Commission departments.
- b. Allocating a specific budget and mandate to funded projects to ensure that they continuously collaborate, and that such collaboration results in tangible outputs. Sufficient resources in terms of personnel must also be allocated in the proposal.
- c. Establishing formal cross-project working groups at the start of funding calls. Partly this has been achieved with the launch of clusters, but more incentives and support should be provided to project partners to actively and effectively collaborate with sister projects towards the dissemination of the knowledge and the production of collaborative results.
- d. Creating pathway-specific Knowledge and Policy Hubs, similar to models in Horizon Europe Missions, could help coordinate and simplify the tangle of networks established to address the goals of Food 2030.
- e. Allowing adequate time between proposal approval and the drafting of grant agreements for interaction and co-designing collaborative plans of action that can be included in the grant agreements.
- f. Considering synergies across pathways and finding opportunities to build linkages and consolidate efforts. Attention needs to be paid to not proliferating endless networks and Living Labs while also ensuring new initiatives can emerge.
- g. Identifying strategies to ensure piloted products avoid the so-called 'valley of death': the gap between early-stage research and development (TRL 4-7) and successful commercialization. This gap is characterized by a lack of skills, funding and resources, making it difficult to move from prototype to a marketable product.

Beyond the scope of Food 2030:

- a. Requiring the delivery of a final report synthesising key findings in relation to the initial objectives and expected impacts. This report should include basic quantitative indicators (e.g., number of citizens involved in the innovation actions, number of businesses created or supported, amount of external investment attracted, etc.) to facilitate future evaluations of projects' impacts (see also Recommendation 9). This report could also provide specific recommendations to translate key findings into policy action at different levels (i.e. local, national and European) to ensure that R&I funding and outputs are geared towards the public good.
- b. Introducing a "Transition to Impact" module within Horizon Europe or upcoming FP10 or the FutureFoodS partnership. Projects nearing completion could submit a brief follow-up proposal, evaluated on excellence, potential uptake, and stakeholder involvement. Funding could be managed through flexible calls, joint programming with Member States, or reserved envelopes within (mission-oriented)

budgets, ensuring that promising innovations move beyond pilots into real-world application and scale.

Recommendation 6: Continue and enhance multi-actor approaches to R&I for food system transformations

Why: By bringing together diverse stakeholders, R&I efforts can better anticipate unintended consequences, design more effective interventions, and implement changes that lead to greater sustainability and impact. Further, diverse perspectives play a critical role in interrogating proposed interventions and solutions to reduce adverse and unintended consequences. The evaluation found that **multi-actor collaborations are critical to the ongoing success and impact of Food 2030, but they require more structural support and guidance.**

How: This recommendation can be advanced by:

- a. Streamlining and better supporting meaningful stakeholder engagement. Projects should be supported by best practices and clear guidance. Critical to this is ensuring that analyses of power relations are undertaken and results are integrated into collaboration strategies (see Recommendation 7).
- b. Ensuring that there are targeted interventions for vulnerable groups based on their specific characteristics, needs and challenges. It is important to explore different modalities of ensuring that participants in project activities can engage and are fairly compensated. Compensating people for their time, knowledge and ideas is not straightforward under the funding structures. Clear guidance, best practices and transparency on the ethics of compensation in relation to R&I is required.
- c. Funding culturally-appropriate, adaptable and affordable interventions, multilingual materials, interpretation and engagement strategies co-designed with underserved communities, and prioritising projects targeting people marginalized or made vulnerable by food systems, using refined, multidimensional criteria.
- d. Supporting the development of improved participatory governance models.
- e. Promoting citizen science in projects relying on extensive data collection linked to biodiversity. The robustness of many pathways is supported by the size and quality of data available. Include a component of citizen science in relative projects and invest in the education and training of teachers, students, volunteers through active organisations.

Beyond the scope of Food 2030:

- a. Emphasising and rewarding projects that consolidate or connect to existing Living Labs (LL) and/or implement effective multi-actor processes. To ensure that the knowledge and impact of the LLs is not lost at the end of a project, continuation of funding to LL could be considered. This could be based on periodic evaluation of the level of aggregation and network of interactions.

Designing and funding positions for key facilitators of LL that are not tied to the project or network, but are more overarching, could serve to enhance the ongoing capacity and impact of the Living Labs and pathways. This is critical to progressing a more sustainable and competitive Europe. It also aligns with goals of simplification as the energy, cost and impacts of starting new Living Labs are significant.

At the same time, LLs should not become overly formalised or institutionalised. Flexibility is required to ensure they remain agile and responsive spaces of experimentation. Attention should also be paid to ensure broad distribution and ensure that opportunities exist for new Living Labs to emerge as required.

Note that while multi-actor collaboration is critical, not all research benefits from a multi-actor approach. More attention to when such collaborations are needed and how to most effectively implement them is required. Attention to stakeholder fatigue and to asymmetries of power, along with extractivist research practices, is critical to maintain fair and sustained collaboration.

Recommendation 7: Ensure structural barriers to transformation are addressed across Food 2030

Why: While it is recognised and commendable that all projects, in some way, work to empower citizens and stakeholders through knowledge-sharing, training, capacity building, and co-creation, **most projects do not adequately target relations or asymmetries of power. Advancing food system transformations requires identifying and addressing structural barriers** (e.g. asymmetries of power, and gender and racial inequalities), and **identifying and acknowledging conflicts and divergent values**.¹⁴ Despite this, structural barriers, conflicts of interest, and asymmetries of power are not adequately considered across Food 2030 programming.

How: This recommendation can be advanced by:

- a. Analysing the diverse incentives, roles and values of actors and stakeholders, and identifying where their interests may diverge and/or conflict across scales. This could include mapping interdependencies and trade-offs between actors to inform the design of more effective incentives while making systemic barriers to change more visible. It can also support dialogues and collaboration around solutions.
- b. Ensuring asymmetries of power and structural barriers (i.e. gender inequality, wealth inequality, corporate concentration, racism, value conflicts, infrastructure, inequitable financial incentives, etc.) are identified and addressed within consortia and Living Labs and between projects and target populations at all stages of funded projects.
- c. Designing longer-term, cross-cutting research and innovations to understand and address lock-ins and barriers to transformation and ensuring insights are translated into Food 2030 programming and policies.

Recommendation 8: Strengthen the science-policy-society interface for food systems

Why: The European Commission's High-Level Expert Group on the science-policy interface for improved food systems governance concluded that food system transformation must be better supported through more ambitious interlinked science-policy-society interfaces.¹⁵ Similarly, this evaluation found that **stronger linkages between projects, pathways and decision-makers are required**.

How: This recommendation can be advanced by:

- a. Identifying mechanisms for more active linkages between SCAR Food Systems Working Group, FutureFoodS, and Food 2030 programming. There are also synergies

¹⁴ Unai Pascual et al., "Biodiversity and the Challenge of Pluralism," *Nature Sustainability* 4, no. 7 (July 2021): 567–72, <https://doi.org/10.1038/s41893-021-00694-7>.

¹⁵ European Commission: Directorate-General for Research and Innovation, Webb, P., Sonnino, R., Fraser, E. and Arnold, T., *Everyone at the table – Transforming food systems by connecting science, policy and society*, Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2777/440690>.

with ARCH (International relations) and Bioeconomy Working Groups, Fish, Protein and Foresight Task Forces that can be strengthened.

- b. Improving coherence by creating a Knowledge and Policy Hub, similar to models in Horizon Europe Missions.
- c. Defining and supporting clear roles and responsibilities for policy officers and project coordinators in linking researchers and projects to decision-making spaces and processes.
- d. Supporting the development of tools for real-time monitoring and long-term behavioural adherence to support more informed decision-making.
- d. Facilitating more interactions between decision-makers and projects to enhance dialogue, raise policy-relevant questions and ensure effective translation of knowledge. This is also critical to facilitating a more aligned regulatory environment for innovations.
- e. Taking inspiration from initiatives like the Montpellier Process: a learning collective, community-owned process convened and curated by an alliance of partners redefining how to model effective, more iterative, and better coordinated Science-Policy-Society Interfaces across scales (global, national and local), across sectors (environment, health, people, agriculture, food) and across knowledge systems.¹⁶

Recommendation 9: Develop and implement a comprehensive Monitoring and Evaluation framework for Food 2030

Why: An integrated Monitoring and Evaluation (M&E) framework can enable learning and assessment of Food 2030's progress, strengthen accountability, and provide the evidence base needed for adaptive management. It can enhance the strategic value of Food 2030 by highlighting tangible progress, identifying gaps, and encouraging learning across pathways and projects. Furthermore, it can improve the visibility of Food 2030's contributions to European and global food system transformation, strengthening credibility and support among stakeholders.

A coherent monitoring and evaluation framework/structure to track progress towards Food 2030 objectives is lacking. The KPIs used in projects are inconsistent and lack aggregation at the systemic level, limiting the ability to assess overall impact, evidence-based decision-making and Food 2030's transformative progress.

How: This recommendation can be advanced by:

- a. Establishing an integrated monitoring and evaluation framework that aggregates project-level outcomes and connects them to Food 2030's overarching objectives. This framework should include:
 - Embedded evaluability assessments, defining who is responsible for collecting, analysing, and reporting data.
 - An explicit Theory of Change outlining the logic of Food 2030's pathways and their expected contribution to systemic transformation, guiding consistent monitoring across projects and pathways (see also Recommendation 1).
 - A robust set of project level, pathway level and policy-level indicators and metrics that reflect the ambitions and priorities of Food 2030, addressing nutrition and health, climate and sustainability, circularity and resource efficiency, and innovation and communities.

¹⁶ Montpellier Process, accessed June 11, 2025, <https://sites.google.com/view/montpellierprocess/home>.

- Clear baseline data collection for each pathway, allowing for progress tracking over time.
 - Beyond Food 2030: consider a requirement for projects to provide baseline (needs assessments) and end-line reports (output/outcome/impact evaluations) showing how their results contribute to pathway progress.
- b. Ensuring the monitoring and evaluation framework is not too restrictive and remains adaptable to encourage creativity and boost innovative capacity. This flexibility could be achieved by allowing projects and/or pathways to define context-specific indicators and incorporating adaptive monitoring mechanisms that can evolve in response to project or pathway needs.
 - c. Adopting a holistic and inclusive evaluation process by involving project partners, thematic experts, internal staff, external evaluators, and community stakeholders, integrating diverse perspectives and expertise. This collaborative approach could promote shared ownership of outcomes and encourage continuous learning through joint reflection.
 - d. Providing more standardised tools to support with assessment of Technical Readiness Level (TRL) and Societal Readiness Level (SRL).

3. Findings

3.1. Impact: Advancing the priorities of Food 2030

The overall impact and contribution of Horizon Europe is clear. A recent evaluation found that investment in R&I through the Horizon Europe Framework was:

a major driver of economic and societal benefits. For every euro of costs to EU society, the programme is expected to generate up to six euros in benefits for EU citizens by 2045. In terms of economic growth, every euro of EU contribution is estimated to generate up to €11 in GDP gains by 2045.¹⁷

Focusing on Food 2030 programming, **the evaluation found that all pathways deliver co-benefits, in varying ways, to the four priorities of Food 2030.** Not all projects were evaluated, and priority was given to those projects that were either concluded or beyond midterm. Further, not all projects have the same goals or funding structures and thus a complete impact assessment or a comparative analysis of projects within pathways, or across pathways, is not possible.

With regards to advancing Food 2030 priorities, the evaluation concludes that at the level of projects, Nutrition is the most widely supported priority, followed by Communities, Climate, and finally Circularity (see Figure 2 **Error! Reference source not found.**). This could reflect the fact that nutrition is both a priority and a pathway. This could also point to a need for greater attention to climate and circularity priorities across Food 2030 programming, if the ambition is to address all priorities equally. At present, the degree of ambition differs across the pathways, which is logical.

Food 2030 programming has directly supported the production of quality outputs across all pathways. All projects have, to varying degrees, delivered results in line with the Food 2030

¹⁷ European Commission, *Interim Evaluation of the Horizon Europe Framework Programme for Research and Innovation (2021 - 2024)*, SWD(2025) 110 final, https://research-and-innovation.ec.europa.eu/document/download/a3aa9b90-15c0-4ea7-b25e-9f4e29cfa740_en.

R&I policy framework and beyond. An overview of the specific outputs of projects considered in the independent evaluations is provided in Appendix 1.

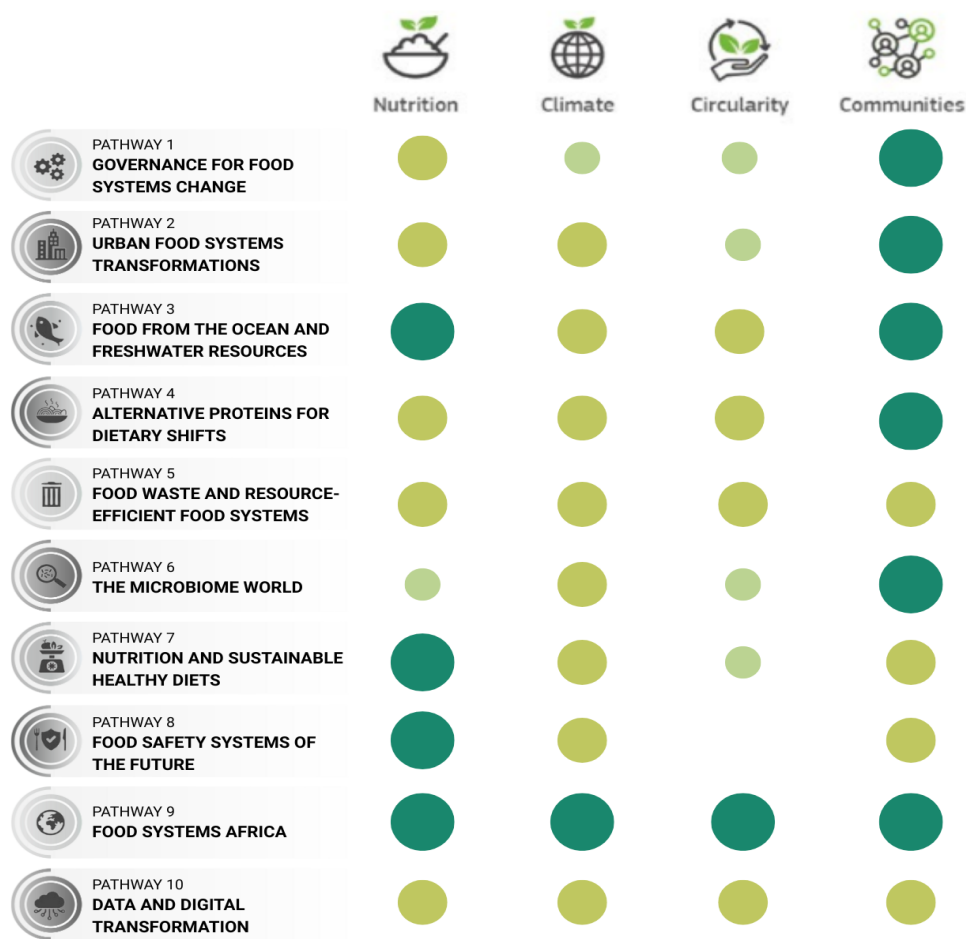


Figure 2 Pathway contributions to Food 2030 priorities

The assessment considers the degree to which each pathway addressed its own ambitions with regards to the four priorities. The dots represent the presumed level of attention with smaller ● representing lower attention, and larger ● representing higher attention. The figure is informed by an analysis of gaps and contributions as identified by the independent pathway experts.

Note that not all Food 2030 projects were considered and the diversity across the ambitions does not allow for cross-pathway (vertical) comparison. For example, some pathways are more ambitious when it comes to community empowerment than others.

Box 1 Best practices: impactful networks

[Horizon4proteins](#) is a network that started by connecting four EU-funded projects working on alternative proteins: NextGenProteins, ProFuture, SmartProtein and SUSINCHAIN. The network was launched at the end of 2021 to work together in key aspects such as: Consumer acceptance of alternative proteins, Safety and Regulatory challenges, Food applications, and Sustainability. Beginning of 2023, the EU Horizon Europe funded projects GIANT LEAPS, LIKE-A-PRO and VALPRO Path joined the collaboration. The network has promoted policy statements, webinars and conferences, drawing attention to the need for advancement on the next generation of plant proteins.



[CLEVERFOOD](#) is designed to engage people from all sectors of society in the transformation of Europe's food system, aligning with key EU initiatives such as the EU Food 2030 Policy Framework, the Farm to Fork Strategy, EU Missions, the EU Bioeconomy Strategy, the European Urban Initiatives, and the Fit for 55 Package. It builds directly on its predecessor FIT4FOOD2030 to advance a Sustainable Food Systems Network to provide support for projects, partnerships and networks aligned with Food 2030. CLEVERFOOD is also part of a collective process with FoSSnet and FoodCLIC to establish a higher-education network focused on food system science across Europe.



[OBECLUST](#) is the European Cluster of Obesity Research Projects. Comprised of nine projects, the aim is to foster a European multidisciplinary network of experts in the field of obesity to jointly strengthen and align project methods, outputs and impact of obesity prevention projects currently funded by the European Commission. The two main objectives of the cluster are: a) To form a peer support group to discuss common methodological strategies and expertise; and b) To establish common methodological and/or policy guidelines to tackle societal, scientific and political issues related to obesity in Europe. At the time of publishing, OBECLUST brings together projects funded mainly under the Cluster 1 (Health) of Horizon Europe, and one project from Cluster 6 which derives directly from Food 2030 programming.



3.1.1. Summary of contributions across Food 2030 pathways

Food 2030 projects have been successful in producing:

- Scientific publications (particularly the case for Research and Innovation Actions).
- Living Labs and networks (see Box 1 and Box 2).
- Business models for testing and scaling up innovations.
- Apps and other ICT tools (e.g. dashboards).
- Data sets (open access).
- Toolboxes to support stakeholders, including policy makers and end-users.
- Novel products (e.g. new energy bars; sensors to monitor the growth and physiological state of microalgae in real-time).

In what follows, important contributions from each pathway are highlighted (see Table 1). The contributions presented were selected to evidence the scope and breadth of Food 2030. Table 1 does not reflect a complete or systematic overview of outcomes and impacts.

Table 1: Selected overview of pathway impacts

Pathways 1 and 2: Governance for Food System Change and Urban Food System Transformation

Direct policy impact at local level

- EU R&I funding was leveraged to help local policy makers make formal political commitments to food (i.e. adoption of food policies and food policy budgets; facilitation of food policy councils, food charters; and municipal food commissions).
- [CLEVERFOOD](#) reveals exceptional impacts on food policymaking at the urban level. Of the 59 European cities across 19 countries that participated in this exercise, 76% have leveraged on EU R&I funding to make a formal political commitment to food; 54% have adopted a food policy (e.g., all 11 cities involved in [FOODTRAILS](#)); and 63% have established a food policy budget – for a total of € 77 million.
- [FUSILLI](#) incentivised the establishment of 8 food policy councils, the launching of 12 food charters, and the creation of 4 municipal food commissions.

Supporting EU and National policy processes

- [SUSFANS](#) provided a platform for inter-service discussion on sustainable food systems for the European Commission.
- Modelling tools were utilised after SUSFANS supported several European Commission services (e.g., the Agricultural Outlook conference and CLIMA's action in the agriculture, forestry and land use sector).

Job creation

- [FoodSHIFT2030](#) led to the creation of food-related jobs. For example in Warsaw, Poland, a Living Lab led by a part-time employee at the municipality expanded to four employees by the end of the project.

Pathway 3: Food from the Ocean and Freshwater Resources

Informed EU policy and other initiatives (including international agreements)

- Support of the EU Algae initiative through policy and investor recommendations on ecosystem services and an assessment of the EU regulatory landscape in a global context by [SeaMark](#).
- Recommendations for wild harvesting of macroalgae and a high-level industry socio-economic impact assessment guidance for policymakers and investors is in

development by [AlgaePro BANOS](#).

- Evaluations of the Common Fisheries Policy including impacts of management measures in place to create evidence-based recommendations ([SEAwise](#)) and a decision support tool for examining fisheries management, policy scenarios and spatial planning simulations within the context of ecosystem-based fisheries management ([EcoScope](#) tool).
- A number of projects (delivered outputs in support of the objectives of the EU Mission “Restore our Oceans and Waters”).

Boosting sustainable production of aquatic food

- [NewTechAqua](#) launched a challenge for digital applications in aquaculture to attract technology developers and providers, [Cure4Aqua](#) developed a prototype novel digital welfare assessment tool that incorporates machine learning methodologies and IoT applications, and [FutureEUAqua](#) along with [iFishIENCi](#) advanced digital technology, sensors, image systems and echosounders for non-invasive continuous control in fish production systems.
- [SAFE](#) establishes protocols and pilots for nutrient capture and reuse to grow low-trophic biomass and [ASTRAL](#) has compiled manuals for the production of new low-trophic species.
- [AWARE](#) demonstrates the concept of creating a new farm-to-fork value chain for European economic growth and urban KM 0 farming

Educating citizens about novel aquatic resources

- [SUMMER](#) organised the impressive METROPELAGIC exhibition in subway stations in Bilbao in collaboration with Woods Hole Oceanographic Institution to familiarise the public with the mesopelagic resources.
- [AquaVitae](#) organised a tasting event in Brest to showcase food from tasty low-trophic species in collaboration with the InEval project (funded by [BlueBio Cofund](#)) and organised a MOOC (Massive open online course) to host new knowledge and training material for educational uses.

Pathway 4: Alternative Proteins for Dietary Shift

Advancing the state-of-the-art of alternative protein

- Development of new legume and microbe-derived proteins for food and beverage formulations, enhancing protein fractionation, characterisation and understanding.

Growing proteins from microalgae on CO₂ emissions

- Single cell proteins from microbes were grown utilising wood biomass and wood residues, and protein from insects (i.e. crickets and black soldier flies) grown on pre-commercial food waste ([NextGenProteins](#)).

Novel alternative protein foods developed

- New foods were formulated with alternative proteins, such as baked and extruded snacking products containing Spirulina, cricket, and Torula powders, vegetarian ready meals containing alternative Torula proteins, and high protein powder-based vegan spreads (NextGenProteins).

Environmental assessment of alternative proteins

- Issues related to the environment and to climate change, as well as important societal needs such as the development of alternative food protein sources able to

secure food supply for the growing global population in a sustainable manner, were addressed ([GIANT LEAPS](#)).

Pathway 5: Food Waste and Resource-Efficient Food Systems

Enhanced access to healthier food from efficient, less polluted systems

- Active promotion of behaviour change to reduce spoilage and encourage healthy consumption habits ([SISTERS](#) and [CHORIZO](#)).
- Enabled diet planning and food bank optimisation, improving food access ([ZeroW](#)).

Addressed food security through food waste reduction

- Redistribution and standard reform and behaviour-driven actions, supporting access to edible food otherwise lost ([REFRESH](#) and [ZeroW](#)).

GHG mitigation and reduced ecosystem pressure

- Quantification of GHG reductions from waste valorisation and reuse ([SCALIBUR](#), [Circular Agronomics](#), [FOLOU](#), [ZeroW](#)).

Climate adaptation and mitigation through improved resource use

- Measurement of systemic impacts and promotion of adaptation-informed R&I ([ToNoWaste](#)).
- Targeted waste from non-functional (e.g. cosmetic) losses, reducing pressure on ecosystems ([FOODRUS](#)).

Raised awareness and engaged

- Citizen campaigns were organised to promote engagement in: biowaste sorting; stakeholder governance hubs; social norms research; awareness-raising around rebound effects; smart labelling as a social innovation tool for behavioural change; and eLearning training to enhance capacity and community innovation

Pathway 6: The Microbiome World

Created a coordinated, transdisciplinary, and cross-sectoral research environment

- Projects had an important impact on EU and global microbiome research and innovation.

Advanced pan-European interoperability in data, standards, and tools for scalable solutions in food safety, sustainability, and microbiome applications

- Shared protocols, data standards, and pan-European microbiome datasets Institutional twinning ([SymbNET](#))
- Multinational datasets ([MASTER](#), [CIRCLES](#), [Simba](#), [Holofood](#), [3D-omics](#), [HealthFerm](#))

Regulatory and policy support

- Direct support to European-level regulators (e.g. EFSA to align innovations with EU safety Frameworks); and contribution to EU strategic tools (e.g. [MicrobiomeSupport](#)'s Strategic Research and Innovation Agenda).

Advanced relevant, field-tested interventions for food safety and sustainability

- Developed and tested microbiome-based interventions in six food chains, evidenced by pilot trials with producers: technical deliverables and peer-reviewed publications.

The interventions will strengthen microbial approaches to food safety and sustainability in real systems (CIRCLES).

Pathway 7: Nutrition and Sustainable Healthy Diets

Advanced the state-of-the-art, particularly around personalised nutrition

- Personalised nutrition interventions: Projects like [NUTRISHIELD](#), [STANCE4HEALTH](#), [PREVENTOMICS](#), and [PROTEIN](#) have contributed largely in this area by developing personalized nutrition technologies and new food products.
- Preventions and/or treatment of childhood obesity ([STOP](#)) and malnutrition in the elderly ([PROMISS](#)).
- Sustainable dietary patterns through different approaches: [FEAST](#), [PLANEAT](#), and [SWITCH](#) worked on sustainable dietary patterns through their various projects focused on diet's true cost, policy transformation, and sustainability data.
- Personalised health (including omics) and diet innovations: NUTRISHIELD and STANCE4HEALTH integrated personalized health and diet innovations involving omics data for personalized nutrition.
- Digital tools (apps, AI, wearables): [CoDiet](#) and [PROTEIN](#) utilized AI-driven apps and wearables for dietary and nutrition interventions.

Enhanced collaboration for EU-added value

- Diverse stakeholders from across Europe have collaborated on research and innovation in areas critical to food systems.
- Created value by fostering collaboration and sharing of knowledge and expertise that might not be available at a national level ([SWEET](#), [CO-CREATE](#), [PROTEIN](#)).

Targeted urgent public health issues related to diet and nutrition

- Projects like SWITCH, FEAST and PLANEAT aimed to address sustainable dietary behaviours which are aligned with the EU Green Deal and UN SDG 2, SDG 3, SDG12.

Impact on policy development

- Provided the EU with crucial data and insights for shaping legislation at the European level (CO-CREATE and SWEET).
- Concrete policy recommendations related to food impact on health and environment or nutrition policies that directly affect millions of people.

Pathway 8: Food Safety Systems of the Future

Progressed food safety systems with benefits to EU food sector, consumers, industry regulation and policy whilst addressing environmental concerns

- Integrated food safety risk assessment ([FoodSafety4EU](#), [FoodSafer](#)) and risk management ([SAFFI](#), [DiTECT](#)) undertaken.
- Digital innovations utilising metadata from in-situ and/or remote sensors and omics technologies to develop and demonstrate next generation food safety and traceability systems was embraced.
- Early examples of use of Blockchain and AI technologies within the food safety and quality domain ([Watson](#), [ALLIANCE](#), [HOLIFOOD](#))

Targeted policy advice

- Worked closely with EFSA on the development of risk assessment platforms. Production of supplementary material such as policy briefs for industry, training materials, databases, analytical and/or digital tools and hubs.

Production of patents

- Effective industry involvement, with several patents filed e.g. for new kitchen tools and appliances as a direct result of the project ([SafeConsumeE](#)).

Pathway 9: Food Systems Africa

Addressed malnutrition and promoted healthy diets

- Consolidated knowledge of 10,000 local urban and rural consumers' food needs and choices, fostering plant-based diets ([FOODLAND](#)).
- 26 new food raw materials/ingredients/products developed, improving food authenticity and safety systems (e.g., through the implemented smart storage, bio-based packaging, characterisation, labelling) (FOODLAND).
- Generating distinctive nutritional recommendations, implementing consumers' nutrition awareness campaigns (FOODLAND).

Enhanced biodiversity

- Valorisation of local varieties and species.
- Facilitated a reduction in input use through the implemented agro-ecological practices, precision irrigation and protection systems, bio-degradable mulching, and integrated aquaculture.

Empowered communities

- Development of data-driven food and nutrition systems that meet societal needs (e.g. through consumer and farmer surveys and creation of relevant datasets).
- Creating a network of local centres of innovation (Food Hubs).
- Conducting learning-centred training activities, producing information and operative documents (e.g., training materials, protocols and guidelines on innovation uptake and management, practice abstracts, nutritional recommendations).

Pathway 10: Data and Digital Transformation

Tools for developing digital solutions

- Outputs have focused on supporting SMEs: the [S3Food](#) project specifically emphasizes supporting SMEs by connecting firms specialized in food processing with advanced sensor technology and providing a voucher system resulting in 58 funded food processing projects.
- A portfolio of pilots was produced: The [DRG4Food](#) project produced 8 pilots for digital solutions applying a toolbox for digital responsibility, and the [FOODITY](#) project had 12 pilots demonstrating data-driven innovations in health and nutrition.

Supported business development

- Strengthened connections between the food community and IT community (e.g. [Data4Food2030](#)).

Addressed risks

- Strengthened interdisciplinarity, notably through the involvement of the social sciences, created awareness on the downsides and/or risks of digital transformation, and provided tools to deal with these risks.

Production of data sets

The production and utilisation of a number of data sets are illustrated by Figure 3 and Figure 4. As an example, the [FNS-Cloud](#) project focused on integrating existing Food Nutrition Security datasets, creating a catalogue and toolkit for the food domain, indicating production and utilisation of data sets.

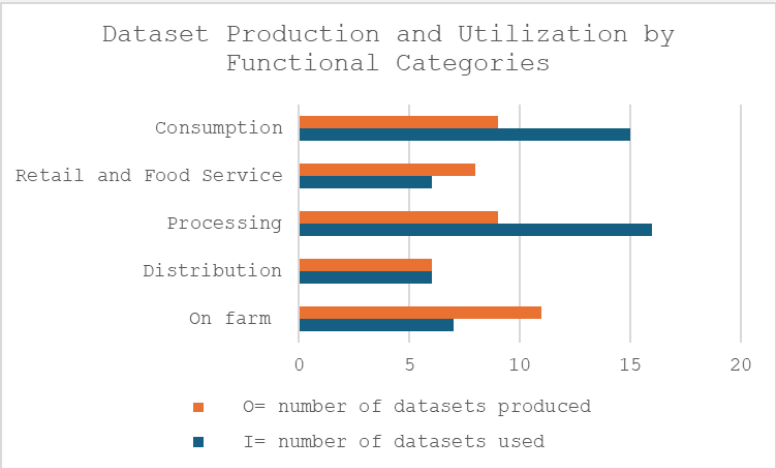


Figure 3 Overview of data set production and utilisation from Pathway 10

On farm= Input supply + Farming/Fishing + Handling & Storage; Distribution= Collecting/Trading + Import + Export; Consumption= Meal preparation + Consumption

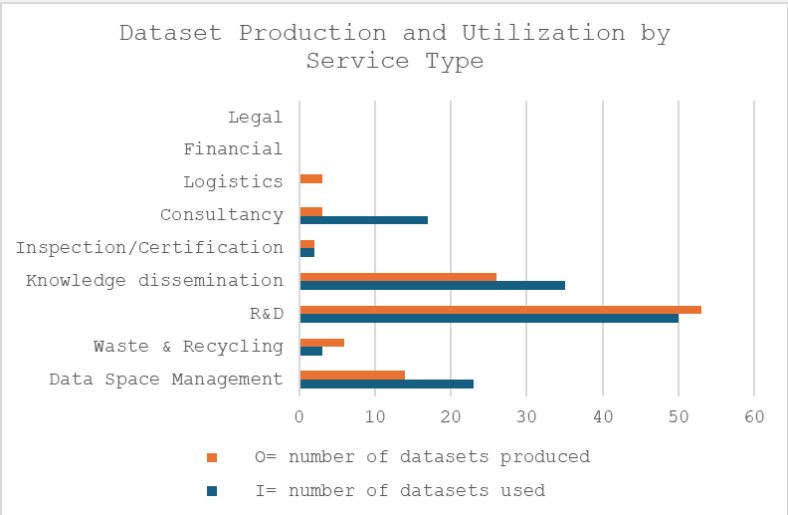


Figure 4 Data set production and utilisation by service type from Pathway 10

3.2. Underlying rationale of Food 2030

The evaluation considered the underlying logics and assumptions informing Food 2030. An evaluation of the operational aspects of Food 2030, including eligibility criteria, funding amounts, processes, rates of acceptance, budgets and timelines are under the remit of the Framework Programme and only partly covered in the scope of this evaluation.

The evaluation found that Food 2030 has adopted a number of structural assumptions which have shaped the logic of the framework. These include:

1. The importance of collaborative, multi-actor approaches to research and innovation.
2. The role of R&I to foster new insights and impacts along with improved technologies that capitalise on the potential of the digital food environment.
3. The need for sound, harmonised and transparent data and monitoring systems.
4. The value of education, training and awareness-raising to advance social-ecological transformation.
5. The need for strong linkages between R&I and decision-makers.

The evaluation confirms these assumptions are robust and highly relevant to the goals of Food 2030.

The evaluation further concludes that the underlying rationale, theory of change and intervention logic of Food 2030 have been pioneering, laying the ground for current debates on systemic and collaborative approaches to R&I for food, and pushing the state-of-the-art on topics including urban food policies, alternative proteins and the microbiome world. More broadly, the evaluation concludes that Food 2030 is closely aligned with EU strategic priorities, thus confirming the political, social, and scientific relevance of Food 2030.

3.2.1. Food system approaches

All parts of food systems need to work together to deliver a secure, sustainable and healthy Europe. At the same time, food systems are changing rapidly with important consequences for the health of people and the planet. By adopting a food systems approach, Food 2030 enables R&I that is better positioned to identify components and interconnections underlying food systems transformation.

The evolution of the pathways overtime points to a greater focus on, and uptake of, food systems approaches, which is evaluated as critical to the effectiveness of Food 2030 programming.

That said, across all pathways, it was noted that the **application of a systems approach was not yet convincingly defined, operationalised or adopted** (see Recommendation 4). More specifically, the evaluation found that:

- Across Food 2030 projects there is a lot of diversity in terms of what constitutes a food systems approach. Greater attention could be paid to what constitutes a food systems approach for Food 2030 and to how systems approaches are being conceived across Food 2030 programming and beyond.
- The independent pathway evaluations found that, despite the trend towards adopting food systems approaches at project level, the tendency remains to adopt single-solution responses to address complex problems. This could also reflect the lack of systems thinking more broadly, for example in policy domains and across the food chain where the approach is more sector specific. In this sense, **the translation of systems-related outcomes into policy processes is not always straightforward**, and could restrict impact.

- Adopting a pathway approach is helpful for identifying triggers and drivers of change and supporting a narrative for Food 2030. On the other hand, pathways can also be seen as a barrier to adopting systems approaches to the extent that they can reinforce thematic silos. The evaluation does not, however, recommend removing pathways, as they provide focus across Food 2030 programming.

The evaluation concludes that **while Food 2030 should not necessarily endorse a single definition or model for food systems, it could be useful to align with the state-of-the-art on food system frameworks and provide general guidance around systems approaches.**

There is no shortage of definitions, frameworks or models for food systems.¹⁸ Many efforts to define food systems frameworks adopt common features.¹⁹

For example, the FAO, the High Level Panel of Experts on Food Security and Nutrition (HLPE) to the UN Committee on World Food Security (CFS), the International Food Policy Research Institute (IFPRI), and the Global Panel on Agriculture and Nutrition (GLOPAN), have all put forward food systems models that target:

- **Drivers of change.** These include: supply chain dynamics; retail and provisioning; transport; production; food safety; food environments; consumer behaviour; businesses. These drivers can also be lock-ins that restrict change.
- **Triggers or accelerators of change.** Often these are separated into biophysical and social-cultural categories, but broadly include: biophysical, climate and the environment; income, growth and distribution, political leadership; social-cultural norms; demographics; economy and trade; and, resource use. Like drivers, triggers can also work to reinforce the status quo.
- **Outcomes of a more sustainable food system.** These broadly include: impact on climate; impact on biodiversity; water and air quality; food security; healthy diets; social inclusion and equity; social stability; and, wellbeing.
- **Policy and the enabling environment.** These include: R&I; policy; regulation; law; norms (i.e. SDGs).

Additionally, many frameworks include the food environment within the wider food system to account for the built and social surroundings where people access, prepare, and consume food. Core activities, including production, processing, retailing, and consumption, are often captured by a supply or value chain.

Building on these frameworks, a food systems approach is applied to the review of Food 2030 pathways to generate proposals for enhancement (see section 3.2.3, Figures 6 and 7).

3.2.2. Food 2030 priorities

The existing Food 2030 priorities are:

1. Nutrition for sustainable, affordable and healthy diets.
2. Climate-smart and environmentally sustainable food systems.
3. Circular and resource-efficient food systems.
4. Food systems innovation and empowerment of communities.

The priorities are evaluated as relevant and appropriately broad to address the complexity and diversity of food systems, and the ambition for food system

¹⁸ Dengerink, J., & Brouwer, H. (2020). *Food system models and methodologies within Wageningen University & Research: opportunities for deepening our food systems work*. (Report / Wageningen Centre for Development Innovation ; No. 2020-023). Wageningen Centre for Development Innovation. <https://doi.org/10.18174/516691>.

¹⁹ HLPE, "Food Security and Nutrition: Building a Global Narrative towards 2030"; Dengerink and Brouwer, "Food System Models and Methodologies within Wageningen University & Research"; IFPRI, "2024 Global Food Policy Report: Food Systems for Healthy Diets and Nutrition."

transformation. They are evaluated as very aligned with the SCAR Food Systems' *R&I Needs and Gaps report*²⁰ and the FutureFoodS partnership Strategic Research and Innovation Agenda's four thematic areas for future R&I needs.

Food 2030 priorities are also comparable to the four main transitions identified by the UN Food System Summit; however, these global goals place more attention on inclusivity, equity and resilience.

Comparing the Food 2030 priorities with other policy priorities, the evaluation concludes that the priorities are politically, scientifically and socially robust and well aligned with the state-of-the-art. This is due to the approach to programming outlined in section 1.3.

The evaluation also concludes that there **are opportunities to strengthen and improve the coherence of the Food 2030 priorities**, as outlined in Recommendation 2.

At present, the titles and descriptions of the priorities are not aligned. **To enhance clarity, coherence and directionality, all priorities can be framed as goals or desired outcomes.** This aligns with food systems frameworks described above.

Defining clear outcomes is important given that food systems do not inherently suggest a direction for change. **Calls for food system transformation need to be accompanied by a description of the desired change.** This reinforces the relevance of a Theory of Change for Food 2030 (see Recommendation 1). Concrete proposals and analysis are put forward in Appendix 2 (see also Figure 5).

A food systems approach can support alignment between the pathways (entry points) and priorities (outcomes) (see Figures 6 and 7). At present, the pathways can also be understood as priorities in that they are levers for change prioritised in Food 2030.

The urgency of the planetary crisis can be made more explicit in these priorities. We are on track for a deepening planetary emergency, having already over-shot six of nine planetary boundaries.²¹ The global food system is a major driver of planetary boundaries, pushing climate change, land-use change and biodiversity loss, depletion of freshwater resources, and pollution of aquatic and terrestrial ecosystems.²² It is true that global food systems have transformed over the last decades, such that the amount of food produced has managed to keep up with a rapidly increasing global population.²³ However, this acceleration in production has not been without consequences and trade-offs.²⁴ Crossing the boundaries of our planet points to an increased risk of generating large-scale, abrupt or irreversible environmental changes, and in turn, social unrest. In short, **continuing to overshoot the planetary boundaries is certain to enhance insecurity.**

²⁰ Silvia Scaramuzzi et al., "Food Systems: R&I Needs and Gaps Report," SCAR FS SWG- Action 1 (Brussels: Standing Committee on Agricultural Research, 2023), https://scar-europe.org/images/FOOD/Deliverables/FOOD-SYSTEMS_RI_Needs_Gaps_Report_12-01-2023.pdf.

²¹ Levke Caesar et al., "Planetary Health Check: A Scientific Assessment of the State of the Planet. Executive Summary 2024" (Potsdam, Germany: Potsdam Institute for Climate Impact Research, 2024), https://www.pik-potsdam.de/en/institute/labs/pbscience/planetaryhealthcheck2024_executive_summary.pdf.

²² Marco Springmann et al., "Options for Keeping the Food System within Environmental Limits," *Nature* 562, no. 7728 (October 25, 2018): 519–25, <https://doi.org/10.1038/s41586-018-0594-0>.

²³ Ramya Ambikapathi et al., "Global Food Systems Transitions Have Enabled Affordable Diets but Had Less Favourable Outcomes for Nutrition, Environmental Health, Inclusion and Equity," *Nature Food* 3, no. 9 (September 19, 2022): 764–79, <https://doi.org/10.1038/s43016-022-00588-7>.

²⁴ Global Panel, "Food Systems and Planetary Goals: Two Inseparable Policy Agendas. Policy Brief," Policy Brief (London, UK: Global Panel on Agriculture and Food Systems for Nutrition., 2023), <https://www.glopan.org/planetarygoals/>; Ambikapathi et al., "Global Food Systems Transitions Have Enabled Affordable Diets but Had Less Favourable Outcomes for Nutrition, Environmental Health, Inclusion and Equity"; Costanza Conti et al., "A Quest for Questions: The JUSTRA as a Matrix for Navigating Just Food System Transformations in an Era of Uncertainty," *One Earth* 8, no. 2 (February 2025): 101178, <https://doi.org/10.1016/j.oneear.2025.101178>.

The evaluation proposes to maintain a focus on climate under the priority of resilience. Climate resilience refers to the ability of systems to prepare for, cope with, and recover from the impacts of climate change. It involves understanding climate-related risks, implementing measures to manage those risks, and building the capacity to respond to climate shocks through adaptation and mitigation. Resilience also captures the capacity of a society to withstand and adapt to various climatic, social, political, and economic shocks and disturbances.

Alongside resilience, the priority **environmental sustainability** can be added. Food systems need not only be climate resilient, but also transform to have far less environmental impact. Unsustainable food system practices threaten the capacity of Europe to produce food, protect health and biodiversity and protect natural resources.

Priority 3 Circularity can be removed as a priority: it is an approach to achieving climate resilience and environmental sustainability. Circularly can be referenced in the description of the other priorities.

Priority 4 Communities can be replaced by **Justice**. Food systems are marked by inequalities and **the importance of just transformations are increasingly recognised across policy domains and science**. A justice approach addresses systemic inequalities in the food system. It moves beyond simply providing food to marginalised communities by tackling the root causes of food insecurity. Here it is important that the focus on empowerment and supporting new business models is not lost.

To summarise, **the proposal is that the objectives of Food 2030 promote R&I for healthy, resilient, just and environmentally-sustainable food systems for all** (see Figure 5).

The priorities (and pathways) of Food 2030 should be developed, or at least endorsed, through bottom-up, multi-actor processes. They should be aligned with policy ambitions but ideally push farther, ensuring that Food 2030 continues to advance the state-of-the-art and remains ready to address emerging challenges and changes.

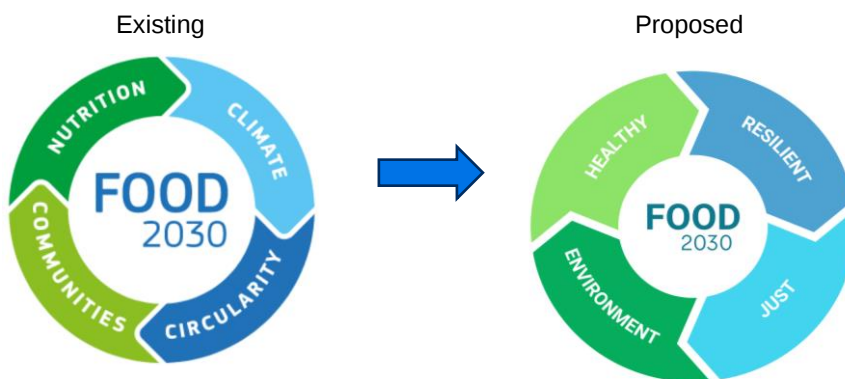


Figure 5 Proposal for revised priorities

3.2.3. Food 2030 pathways

The Food 2030 pathways represent key levers of change where R&I can have deep and multiple impacts on realising a sustainable food system.

While **each of the 11 pathways are evaluated as relevant** for focussing impact and driving progress around the four priorities, there are opportunities for consolidation and re-imagining these pathways. Analysis and more elaborated proposals are included in Appendix 3.

The **evaluation found inconsistencies around the way the pathways are described**: with some evoking desired changes (e.g. Pathway 8 Food safety systems of the future), and some remaining description (e.g. Pathway 6 The microbiome world). More alignment here would support a coherent narrative for Food 2030.

Using descriptive titles rather than directional titles (i.e. Food Safety Systems rather than Food Safety Systems for the Future) could help to simplify the message and create coherence in the narrative of Food 2030 by distinguishing between pathways and priorities (or outcomes).

The evaluation found that **more targeted communication around Food 2030 pathways, including the relations to the priorities and projects, is required**. A lack of awareness, particularly on the part of project participants and stakeholders, restricts opportunities for collaboration and progression of the pathways.

Applying a food systems approach to the logic of the pathways (and priorities) is instructive. Food 2030 pathways can be categorised in terms of triggers, drivers and outcomes.

Drivers of food system change are activities or R&I entry points into the food system, including:

- Pathway 2 Urban food system transformation
- Pathway 3 Food from the oceans and freshwater resources
- Pathway 4 Alternative proteins for dietary shift
- Pathway 5 Food waste and resource efficient food systems
- Pathway 6 The microbiome world
- Pathway 9 Food systems Africa

Triggers or accelerators influence drivers of the food system. If properly activated, ‘through suitable strategies and policies, they spread their impacts throughout agrifood, socioeconomic and environmental systems to achieve the desired outcomes, thanks to their multiple systemic linkages and feedback effects’.²⁵ Triggers include:

- Pathway 1 Governance for food system change
- Pathway 10 Data and digital transformation

Triggers can remain entry points for R&I (and in turn be the subject of specific calls), but they should also be transversal across all projects to reflect their role as food system transformation accelerators.

There are also pathways that are both drivers and outcomes:

- Pathway 7 Nutrition and sustainable healthy diets
- Pathway 8 Food safety systems for the future.

Figure 6 maps the current logic of Food 2030 priorities onto a food systems framework and highlights the coherence of the programming. It shows that the underlying rationale and structure of Food 2030 broadly aligns with a food systems approach but that there are opportunities to further align. For example, the pathways do not clearly distinguish between drivers and triggers of transformation.

²⁵ FAO. 2022. *The future of food and agriculture – Drivers and triggers for transformation. The Future of Food and Agriculture*, no. 3. Rome. <https://doi.org/10.4060/cc0959en>

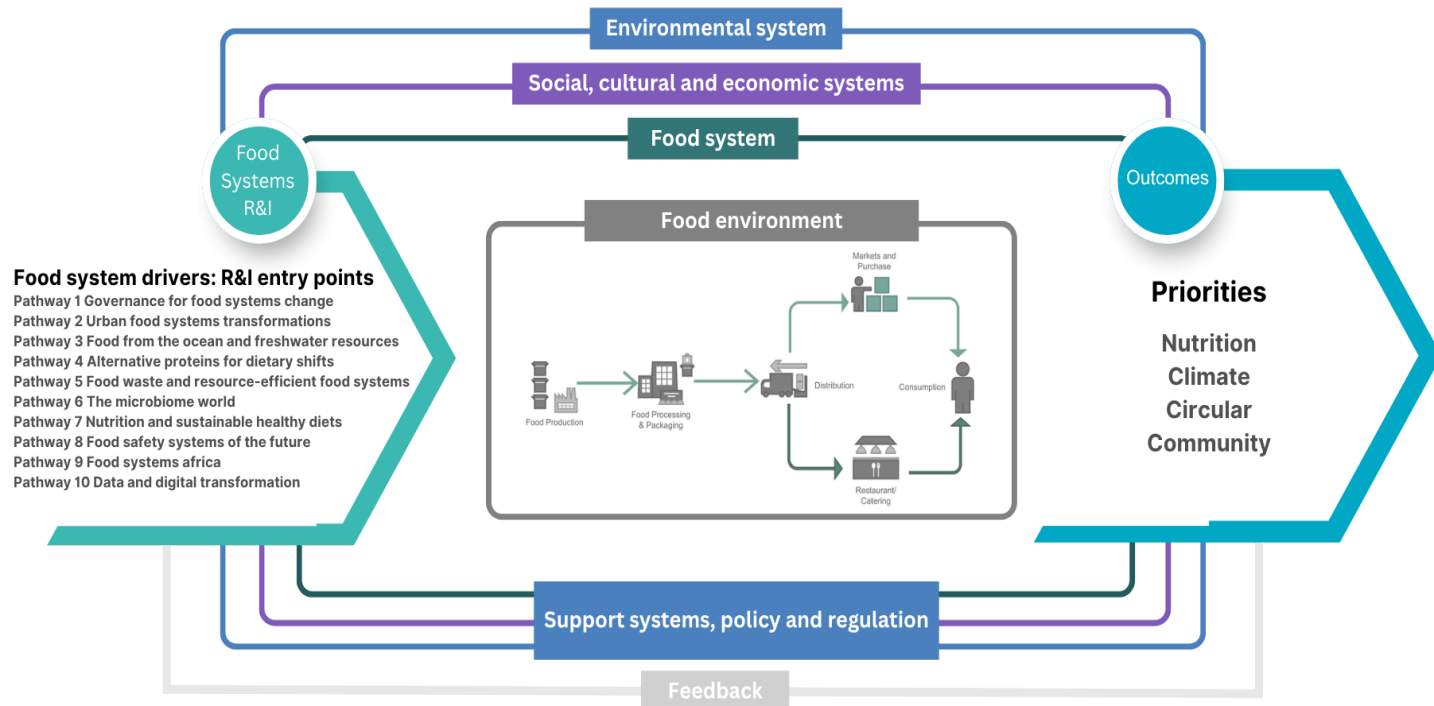


Figure 6 Mapping Food 2030 onto a food systems framework²⁶

²⁶ Food supply chain image from Siddarth Jayaprakash, "Role of Prosumer Driven 3D Food Printing in Innovating Food Value Chains" (Master of Science (Technology), 2017), <https://doi.org/10.13140/RG.2.2.30752.10242>.

There are some, though not many, opportunities to streamline and reduce the number of pathways, also to align with broader efforts to simplify Horizon Europe (see Recommendation 3). Targeted reflections, elaborated in Appendix 3, are presented with caution given that all pathways have advanced Food 2030 priorities, and the pathways have been identified by an adaptive, bottom-up co-creation process.

In terms of consolidation, the evaluation finds that Pathway 4 Alternative proteins for dietary shift directly targets dietary shift and can thus be incorporated under Pathway 7.

If such consolidation were to occur, it would be important to maintain the visibility of alternative proteins under the broader pathway of Nutrition and Sustainable and Healthy diets.

The evaluation proposes to refocus Pathway 5 around resource-efficient food systems, thereby removing the explicit focus on food waste. Resource-efficient food systems should, by definition, avoid food waste.

While outside the scope of the evaluation, key elements of Pathway 11 on Zero pollution could also be included under Pathway 8 on Food safety systems and Pathway 5 on Resource-efficient food systems.

The evaluation of Pathway 1 and 2 was combined into a single independent expert report, pointing to overlap between these two pathways. This could indicate an opportunity for convergence. However, there are a few points for consideration:

- Governance of food systems should not be reduced to the governance of urban food systems. The governance of food systems is a critical trigger for transformation. It is highly transversal and relevant to all pathways. Food governance remains poorly understood.²⁷ R&I is critical here.
- Urban food systems should also not be reduced to governance; they encompass all activities related to providing and provisioning food within a city. That said, urban food systems are not isolated and **the pathway could adopt a more relational approach**. The idea of city-region food systems,²⁸ or sustainable places,²⁹ could be an effective way to reframe this pathway.

On this basis, the evaluation recommends to keep both pathways, but to reduce overlap between the two and position Pathway 1 as a transversal trigger for food systems transformation.

Figure 7 presents the proposals above mapped onto the food systems framework.

As a final reflection, the language of pathways is both common across food systems scholarship, and an important metaphor for how change will happen. The evaluation has proposed the possibility of reframing the pathways as drivers and triggers. Both of these represent pathways towards the desired outcomes of Food 2030. As such, the pathway language could be maintained, also in an effort to reduce complexity.

²⁷ Kate R. Schneider et al., "Governance and Resilience as Entry Points for Transforming Food Systems in the Countdown to 2030," *Nature Food*, January 14, 2025, <https://doi.org/10.1038/s43016-024-01109-4>; Ann Trevenen-Jones et al., "Food Systems Governance and the Public Sector: An Overview" (Global Alliance for Improved Nutrition, January 29, 2025), <https://doi.org/10.36072/wp.47>; Mechthild Donner, Maurine Mamès, and Hugo de Vries, "Towards Sustainable Food Systems: A Review of Governance Models and an Innovative Conceptual Framework," *Discover Sustainability* 5, no. 1 (November 16, 2024): 414, <https://doi.org/10.1007/s43621-024-00648-x>.

²⁸ John Lever and Roberta Sonnino, "Food System Transformation for Sustainable City-Regions: Exploring the Potential of Circular Economies," *Regional Studies*, 2022, <https://doi.org/10.1080/00343404.2021.2021168>.

²⁹ Sonnino, Pathway 1

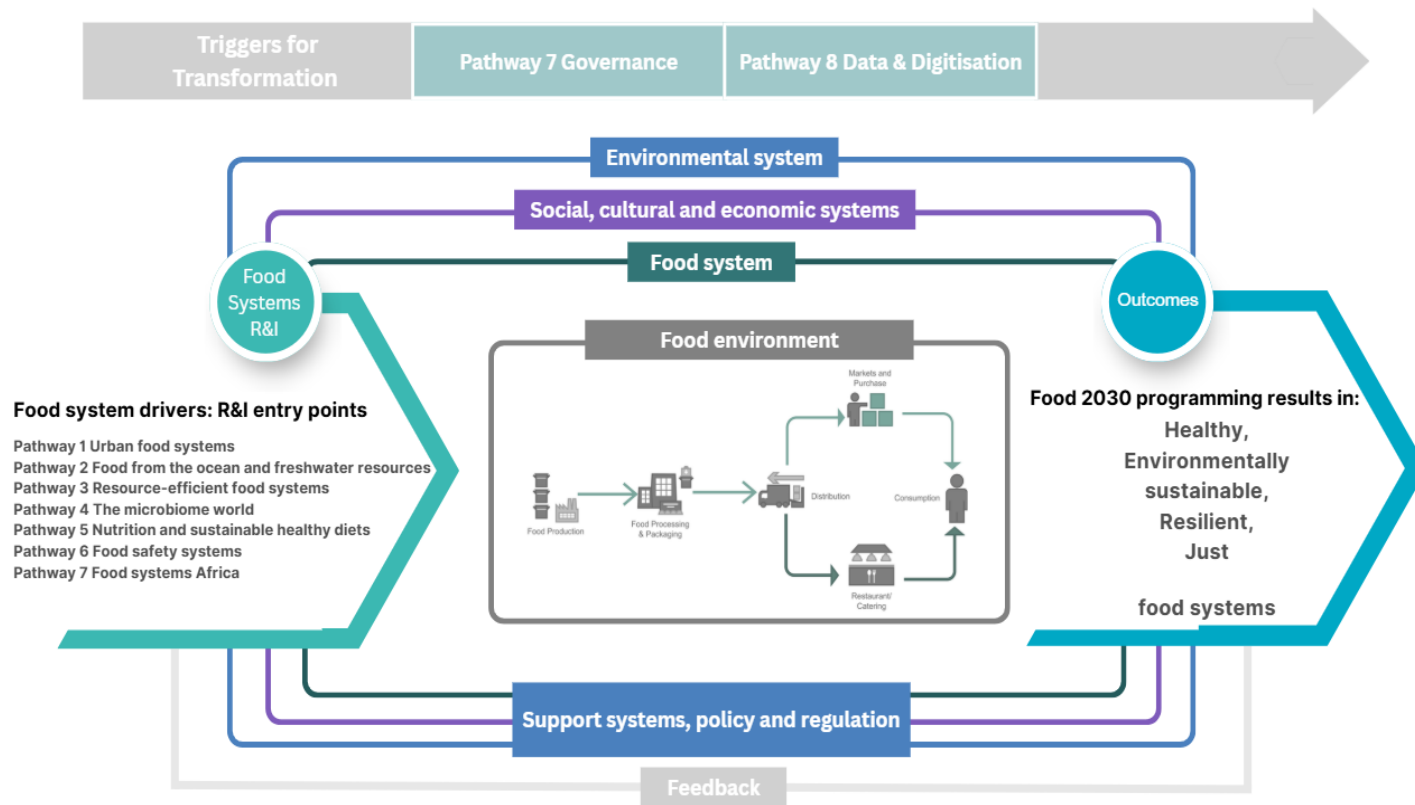


Figure 7 Proposals for alternative R&I entry points and outcomes³⁰

³⁰ Food supply chain image from Jayaprakash, "Role of Prosumer Driven 3D Food Printing in Innovating Food Value Chains."

3.2.4. Collaboration

Collaboration ‘is at the core of the Framework Programme’³¹ and has been identified as critical to the alignment and success of projects and pathways. This supports the recent evaluation of the Horizon Europe Framework programme which found that collaboration ‘is a key driver of excellence’.³² Indeed, the EU’s Framework Programme has established:

A strong project pipeline that, through collaboration and scientific excellence, has proven able to generate solutions to tackle some of the most pressing global challenges and bring about impactful disruptive innovation. R&I is at the core of the EU’s competitiveness drive.³³

Further:

Although the Framework Programme has achieved considerable results, the evaluation highlights that **collaborative activities are complex to navigate...** The priority for the coming years is to reduce this complexity and **promote the quality of collaborations**.³⁴

Here, **Food 2030 can be a leading example.**

The evaluation concludes that partnerships, fostered particularly through collaborative research and innovation projects, are critical to advancing the vision of Food 2030. There are certainly opportunities to improve how collaborative research is supported. The evaluation confirms that meaningful collaborations, particularly those that truly engage vulnerable and affected populations, or diverse disciplines and sectors, are often complex, but necessarily so. To assume that this complexity could be reduced would ignore divergent values and priorities. This could work to enhance polarization, rather than reduce it.³⁵ Strategies for managing complexity and ensuring quality should be promoted over efforts to reduce complexity in ways that flatten diversity and meaningful collaboration.

A strong conclusion from the evaluation is the need to enhance collaboration across pathways. It is critical that the pathways build ecosystems and not silos.³⁶ There are strong interconnections across the pathways. This can support co-creation across the different parts of the food systems.

Many Food 2030 projects have required Work Packages dedicated to facilitating collaboration and knowledge exchange. In addition, REA has organised some Cluster projects across pathways for knowledge exchange. The evaluation found that despite these efforts, **collaboration across Food 2030 can be significantly improved**, and should be a priority as knowledge, skill and network transfer remains weak between projects.

One reason for limited collaboration could be that these work packages are designed without knowledge of the sister projects, or how they plan to organise that work. This approach risks creating more work and less collaboration. This applies more specifically to Research and innovation action (RIA) and Innovation action (IA), than to Coordination and support action (CSA) that directly aim to improve cooperation. Further, many efforts at collaboration between project promote communication and dissemination over scientific collaboration.

The need for a more transversal approach and collaboration across pathways is also recognised, particularly with regards to Pathway 1 (Governance for Food Systems Change)

³¹ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL: Horizon Europe: Research and Innovation at the heart of competitiveness, [COM/2025/189 final](#).

³² *Ibidem*.

³³ *Ibidem*.

³⁴ *Ibidem*.

³⁵ Mouffe, Chantal. *On the Political. Thinking in Action*. London: Routledge, 2005.

³⁶ Kontogianni, Pathway 7.

and Pathway 10 (Data and Digital Transformation). This aligns with the evaluation of the pathways. More attention should also be paid to the exploration of how to better facilitate collaboration and leverage insights from the pathways to advance the goals of Food 2030. This should be done with consideration of the capacities and resources of project consortia. The evaluation finds that addressing this point is critical given that **weak collaboration across pathways was identified as a limiting factor in the progression of the pathways**.

Additionally, **collaboration between projects in R&I programmes with other sectors** (e.g. Digital, Transport, Health, Manufacturing etc.) is critical for impact. For instance, to improve environmental sustainability the issue of transport in the global food system deserves attention.

3.2.5. Multi-actor approach

Alongside collaboration, multi-actor approaches are at the core of Food 2030. A multi-actor approach:

refers to a transdisciplinary R&I approach that actively involves a wide diversity of sectors (from primary production to food waste management) and stakeholders (including researchers, policymakers, representatives from the public and private sectors, NGOs and civil society).³⁷

The evaluation found that this approach has provided benefits to the projects and, in turn, the pathways.

The use of participatory approaches to engage all stakeholders in research makes early interventions and social shaping of technologies and innovations possible.³⁸

At the same time the **full integration of actors from across sectors and society** (e.g. primary production, processing and manufacturing, retail and food service, health, education, consumption) **remains underdeveloped**.

Living Labs have played an important role in facilitating meaningful, and, at times, sustained, multi-actor activities (see Box 2). Living Labs are user-centred, place-based, and transdisciplinary research and innovation ecosystems, which involve key stakeholders and other relevant partners, at different levels (normally regional or sub-regional level) in participatory processes to identify challenges and co-design, test, monitor and evaluate solutions, in real-life settings.

The evaluation found that Living Labs have been effective in expanding and strengthening networks, co-creating innovative business models, facilitating job creating, advancing policy innovations, and transferring knowledge and skills.

3.2.5.1. Points of attention for collaborative, multi-actor research

While multi-actor approaches, such as those facilitated by Living Labs, are critical and have been shown to support the pathways to advance the priorities of Food 2030, the evaluation also raises three points of concern.

First, Food 2030 has supported the development of many networks and Living Labs to engage and connect stakeholders. However, the expansion of networks is now at a point of promoting more confusion than connection. The large number of networks means that it is difficult to navigate and/or get acquainted with all of them. If projects want to create new networks, they should have to justify the added-value of that network and ensure they cannot connect to, or build on, existing networks.

³⁷ Sonnino, Pathway 1&2.

³⁸ Amudavi, Pathway 9.

Second, and related to the first, there is a concern around the risk of stakeholder fatigue, particularly around Living Labs that demand significant effort and resources to develop.

Third, managing multi-actor projects is particularly intensive and can detract or distract from more focused research processes. It is important to continue to support research projects and to ensure they are not evaluated exclusively/predominantly on the basis of multi-actor engagement. More focused research projects can be critical to progressing that state-of-the-art and can address questions raised by, or feed back into, multi-actor processes, such as Research and Innovation (RIA) and Coordination and Support (CSA) projects.

3.2.5.1.1. Attention to sectoral collaboration

Within the collaborative approach, it is also noted that **sectoral collaboration could be better leveraged**. Bringing together actors from the same sector can support the advancement of common visions, norms and standards necessary to accelerate alignment and change in a sector. Importantly, sectoral collaboration can contribute to advancing measurement and reporting standards, making data more consistent and homogeneous. Collectively, a sector can be supported to identify priorities, develop tailored solutions, pilot and scale them up across the sector. Improved sectoral collaboration can also support assessment processes through collective targets, with focus on collective responsibility supported by dedicated monitoring.

The evaluation also found that there was a lack of visible industry feedback on outputs. Moreover, **industry take-up was limited and few demonstrations/pilots had evidence of economic cost-benefit analysis which could help promote industry uptake**. Training and targeted support for relevant projects is required here.

[SafeConsumeE](#) appears to have been particularly effective at getting industry involvement, with several patents filed for new kitchen tools and appliances as a direct result of the project.³⁹ However, it remains unclear whether these took place within the project's lifetime or in its successful post-project period.

3.2.5.1.2. Attention to people marginalised by food systems

Within Food 2030, attention has been paid to engaging people marginalised by food systems, and to diverse forms of inequality. However, the evaluation found that more attention is required. Many funded projects acknowledge the importance of focusing attention on marginalised actors but this is not adequately translating to practice. Across the pathways there was relatively low engagement with low-income and culturally diverse communities. Part of the challenge could be the limited definition and reach of interventions for vulnerable groups (beyond social-economic criteria). The proposal to add 'Justice' to the priorities of Food 2030, and Recommendation 7 to address structural barriers, aim to target this concern.

To ensure fair and meaningful engagement, **ethical and societal considerations** must be addressed. Analyses of power must take place and translate into the logic of projects. It is also noted that the financial guidelines under the Framework Programme make compensating participants very challenging. This can be seen as a limitation to ensuring fair and meaningful participation of diverse stakeholders, particularly under-resourced ones. Best practices on how to do this are not widely shared, but could help projects to design more equitable and diverse multi-actor collaborations.

³⁹ Brereton, Pathway 8.

Box 2 Best practices: impactful, multi-actor Living Labs

HealthyFoodAfrica is a research & innovation project aimed at more sustainable, equitable and resilient food systems in 10 African cities. The project is a collaborative effort by 17 partners in Europe and Africa. HealthyFoodAfrica improves the sustainability and resilience of food systems and innovates practices and governance arrangements in ten localized, context-specific Food System Labs.

Using an interactive, multi-actor approach, HealthyFoodAfrica brings together social entrepreneurs, farmers, activists, businesses and policy makers to tackle specific challenges in the local food system. The initiatives fostered in the Food System Labs are supported by researchers and practitioners from Europe and Africa, who will also take part in enhancing and facilitating the learning processes within each lab and across them. Examples of specific Living Labs, and their activities, include:

- Kenya: Kisumu, Diverse, Safe, Nutritious and Affordable foods for the urban poor in Kisumu.
- Kenya: Nairobi, Boosting food security, safety and nutrition of slum dwellers.
- Uganda: Rwamwanja Refugee Settlement, Maize value chain governance with smallholder farmers.
- Ethiopia: Bahir Dar, Improving supply, marketing and utilization of nutritious food in urban and pre-urban areas.
- Zambia: Lusaka: Capacity building, formal recognition and participation of food traders and vendors.

(Source : <https://healthyfoodafrica.eu/food-system-labs/>)

LIKE-A-PRO is a EUR 13.9 million project to facilitate sustainable and healthy diets by mainstreaming alternative proteins and products, making them more available, accessible, and acceptable to all population groups (from children to elderly, vulnerable groups) and everywhere (across Europe, in urban, peri-urban, and rural areas). As alternatives to animal-based proteins, innovative protein sources can help alleviate health and environmental challenges in the food system. The LIKE-A-PRO project has established Living Labs in 11 European countries to engage with consumers and explore barriers and opportunities related to the uptake of alternative proteins. They also published a series on How to Run Successful Living Labs related to Governance Frameworks, Participant Recruitment and Engagement, and Train the Trainor Sessions.

(Sources : <https://www.like-a-pro.eu/about/>
<https://www.like-a-pro.eu/news/the-like-a-pro-publication-series-sheds-light-on-how-to-run-successful-living-labs/>)

4. Looking ahead

4.1. Gaps across Food 2030

The evaluation has identified gaps that can be better targeted across Food 2030:

- A common understanding of what constitutes a food systems approach across Food 2030 is lacking (see Recommendation 4).
- **Indicators and processes to assess impact are lacking** across pathways, making it challenging to identify and claim impact.
- **Tools for real-time monitoring** and long-term behavioural adherence are lacking, for example around nutrition, which could allow for more relevant policy input.
- The **interoperability of digital solutions** remains weak. Attention to post-project uptake remains a gap across Food 2030.
- **More emphasis is needed on post-production processes.** For example, attention to food service is lacking across most pathways, though under Pathway 5 we do see examples of actions to support food services to reduce their food waste. This could be a critical gap given that in 2022, the Food and Beverages subsector included 1.5 million enterprises employing 8.4 million people, and contributing to the EU's business economy with a value added of EUR 180.7 billion.⁴⁰
- Overall, Food 2030 pays **inadequate attention to structural barriers** that restrict transformation (see Recommendation 7). Such barriers include, but are not limited to, gender inequality, asymmetries of power, a fragmented governance landscape (addressed to some degree in Pathways 1 and 2), and conflicting values and worldviews.⁴¹ A failure to address these structural barriers across R&I will impede the transformative capacity of the outputs.
- **Education and skills development** is a key lever for growth.⁴² Supporting 'systemic education (from elementary to senior education, vocational education and life skill development) is recognised as important for supporting transitions to just and safe food systems.'⁴³ However, the evaluations undertaken by pathways experts reveal limited attention to education and training across Food 2030. There is a need for **capacity-building and training around system thinking** (though it is noted this is an aim of the ongoing FoSSNet project), **entrepreneurship and economic cost-benefit analysis** to promote industry uptake.
When projects do develop training materials, there is little feedback on their assessment and uptake by end users. There are opportunities to strengthen connections to education policies (e.g., integrate with Erasmus+ programmes). This would be coherent with efforts to align 'education and R&I agendas in knowledge and innovation systems that are better oriented towards the barriers and opportunities of food systems transformation and thereby lower the risks associated with new technological developments.'⁴⁴
- The effective **translation** and uptake of Food 2030 outcomes to decision-makers and policy frameworks is lacking (see Recommendation 8). Related, there are common challenges with **regulatory and legal frameworks** that do not align with the state-of-

⁴⁰ "Businesses in the Accommodation and Food Services Sector," accessed May 27, 2025, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Businesses_in_the_accommodation_and_food_services_sector.

⁴¹ Brice Even et al., "Defining Barriers to Food Systems Sustainability: A Novel Conceptual Framework," *Frontiers in Sustainable Food Systems* 8 (November 27, 2024), <https://doi.org/10.3389/fsufs.2024.1453999>.

⁴² Alfonso Arpaia, "How Skills Can Drive Competitiveness," *Intereconomics* 2025, no. 1 (2025): 18–27, <https://www.intereconomics.eu/contents/year/2025/number/1/article/how-skills-can-drive-competitiveness.html>.

⁴³ European Commission: Directorate-General for Research and Innovation (2023), 31.

⁴⁴ Ivi, 32.

the-art, thereby possibly slowing down, or impeding innovations and scaling. This is not a call to de-regulate, but rather ensure regulation keeps up with R&I.

- **Methods, theory and practices to strengthen partnerships** between science, society and industry, and the need to bring society along, can be strengthened across Food 2030, with particular attention to meaningful and fair participation of marginalized communities.
- **Data resulting from Food 2030 projects remain dispersed** and data sets are not adequately taken up and analysed within or across projects and pathways. The data ecosystem remains fragmented and the quality of data needs to be better regulated. **With respect to the veracity of data, there is an urgent need to ensure that data is collected that is fit-for-purpose for use in modelling and prediction.** An infrastructure for standards needs to be created/revisited to ensure models are not being developed on erroneous data. The area of food fraud is a good example where there is little reliable data, yet supposed prediction models are being developed. Research around such data systems could also support a next generation Rapid Alert System for Food and Feed (RASFF) resource.⁴⁵
- **Support in the switch from publicly-funded research to privately-funded implementation and scaling-up** remains a challenge for the EU R&I programmes. There is a gap in R&I instruments specifically for the phase known as the 'Valley of Death' in the innovation process where tested innovations struggle to transition into marketable products or operational use. There is a need to **strengthen the demonstration and piloting processes to ensure real end-user feedback is captured** as well as quantitative economic evaluation of costs and benefits.

5. Conclusions

5.1. Broader framework considerations

Throughout the evaluation process, a number of more general points that fall outside the scope of Food 2030 programming were identified for consideration at the level of the Horizon Europe Framework Programme.

5.1.1. Design, implement and incentivise new strategies to improve knowledge and innovation transfer and uptake

Important outputs and tools developed under Food 2030 are not being adequately leveraged or taken up across Food 2030 programming and beyond. Broader and more systematic translation and uptake of high-quality outputs will reduce duplication and facilitate progression of the pathways.

This could be addressed by:

- a. Incentivising projects to build on existing outputs where appropriate. This should be done in ways that do not unfairly privilege previous or existing consortia in new funding rounds. Each project could identify the outputs developed by previous EU projects that could be used and the collaboration areas for core project activities. Workshops between the research teams and integration of mutual research topics in the project programmes would stimulate collaboration (see Recommendation 5). This could include a mutual budget to share resources.

⁴⁵ Brereton, Pathway 8.

- b. Identify options in Zenodo open data repository⁴⁶ to create Food 2030 Pathway Communities so that project deliverables can be quickly and collectively accessed. These communities could be shared with existing projects and new projects to facilitate the sharing of knowledge. Data sharing and knowledge resources repositories, like Zenodo, should be reinforced to enhance cross-learning, integration, exploitation and scalability of the past, current and future projects results, while also targeting all the involved target groups. In addition, existing toolkits evaluated as high-quality and relevant, should be stored and made available to facilitate training and capacity-building activities within newly established projects. An initiative such as FutureFoodS' Knowledge Hub on Living Labs could be expanded on in the future.⁴⁷
- c. Funding infrastructure for data integration and federated platforms to enable ethical, cross-project sharing, and meta- or machine-learning analysis. This also includes investments in interoperable digital platforms and repositories linked to prior EU data projects. Improved promotion of Common European Data Spaces⁴⁸ is important here.
- d. Taking steps to enhance the standardisation of open access datasets across projects and pathways (where feasible and appropriate) to allow for greater comparability and analysis beyond the project.
- e. Ensuring the visibility and communication of project output post-implementation is a prerequisite for achieving impact. Maintaining networks, platforms and infrastructures is also pivotal. Projects could be encouraged or required to:
 - a. Publish legacy booklets presenting project output and potential applications in a compelling way.
 - b. Create legacy material tailored to different audiences.
 - c. Ensure project websites remain updated for at least five years post implementation to continue to capture activities. Budget needs to be made available for this (see section 5.1.2).
- f. Designing and launching calls to finance near-market development for targeted project products/results.
- g. Promoting open-source, interoperable digital tools that support real-time monitoring and long-term behaviour change, ensuring alignment with GDPR and digital inclusion standards.
- h. Undertaking administrative action to promote open-access publishing. The high cost of open access publishing discourages partners to spend budget on the purpose and often coordinators encounter difficulties in promoting open access publishing between partners. Make the target for open access publication clearly visible in the proposal and the grant agreement by ensuring that the budget for open access publishing is clearly stated in the proposal and the evaluation ensures that it is realistic. Coordinators and partners could be provided with targeted guidance about open access publishing at the kick-off meeting and it is explicitly evaluated at the periodic progress reports.

A best practice is the pan-European Smart Specialisation Strategy Food (S3Food) Partnership.⁴⁹ Particularly relevant for Agrifood Companies, S3Food sets out a platform and supportive business ecosystem between agri-food clusters and clusters representing technology and/or digital solution providers, relevant RTOs and other stakeholders.

⁴⁶ Zenodo is a general-purpose open repository developed under the European OpenAIRE program and operated by CERN. <https://zenodo.org/>

⁴⁷ Sonnino, Pathway 1&2

⁴⁸ See <https://digital-strategy.ec.europa.eu/en/policies/data-spaces>

⁴⁹ Beers, Pathway 10.

5.1.2. Reconsider approaches to funding and end-of-project timelines

The evaluation concluded that mechanisms for funding and project timelines can restrict engagement and impact. There is an intention to simplify processes associated with acquiring and spending funds under the Horizon Europe Framework Programme.

The move towards lump-sum payments is highlighted as an important step here (though more research is needed to understand the impacts at the level of project partners and how this affects the design and delivery of projects).

This could be further addressed by:

- a. Incentivising cascade funding, also known as Financial Support for Third Parties (FSTP). Cascade funding is a EU-funding mechanism to distribute public funding to assist beneficiaries, such as start-ups, scale-ups, SMEs and/or mid-caps, in the uptake or development of innovation.⁵⁰ The Cascade Funding Hub is highly relevant here. Cascade funding open calls has been identified as a successful way to include SMEs as participants in the projects and is indeed critical for bringing SMEs into projects.⁵¹
- b. Addressing structural barriers within Food 2030, particularly the need for more flexible implementation and amendments (e.g. deadlines, costs). For example, the implementation process could be simplified by allowing some adaptations without triggering the amendment process (e.g., marginal changes in the deliverable title or schedule). Small equipment costs (e.g., laptops) could be fully reimbursed by introducing a threshold to exclude the application of the depreciation rule. By limiting the EU bureaucracy and simplifying the heavy reporting practices. Greater flexibility in terms of shifting resources across budget lines, will help projects adapt to evolving situations. This needs to be done in alignment with legal requirements.

Another conclusion of the evaluation is that there are **opportunities to strengthen Food 2030's impact by expanding the continuity of the projects**. In short: the project timelines are not conducive to maximising dissemination. At present, there is a high risk that the project legacies (e.g. knowledge, tools, network of partners, etc.) are not adequately leveraged to accelerate change at scale. This leads to duplication and slower progress.

More attention to building on, rather than building new, can facilitate more impact and progression of the pathways. Furthermore, many scientific papers and PhD theses are written post-project and are thus not always actively disseminated or communicated by or through the project. While there are guidelines for projects, the evaluation found that they are not always respected or even known. In short, at the termination of projects there is a gap in follow-up activities and resources are needed to derive impacts from the project achievements.⁵²

At the same time, **there is no clear structure to monitor how the results of projects can be combined to transform food systems over time**; the transfer of key exploitable results into a strategy to achieve the overarching objectives is not completed. It is noted that given the complexity of bringing together the outputs from the pathways, common KPIs, milestones and action plans are needed.

How: This recommendation can be advanced by:

- a. Changing the typical Horizon Europe project profile. Restructuring the typical project profile used in Horizon Europe to consider that in most projects the most mature and

⁵⁰ F&T Portal IT, "Cascade Funding Calls / Financial Support for Third Parties (FSTP)," EU Funding & Tenders Portal: IT How To, 2021, <https://webgate.ec.europa.eu/funding-tenders-opportunities/pages/viewpage.action?pageId=25559615>.

⁵¹ Beers, Pathway 10.

⁵² Brereton, Pathway 8.

consolidated outputs inevitably come towards the end of a typical project life, rendering meaningful dissemination/exploitation impossible.

- b. Ensuring that future projects have a different profile (but no extra budget) that includes an additional smaller resourced “tail” reserved purely for dissemination purposes. This will allow for outputs to be better exploited, research papers to be written and engaging stakeholders with more mature outputs (properly archived). There would be no increase in funding, no additional time for research, just a different profile with the final period of the project being exclusively for dissemination purposes, e.g. a 3-year RIA would become 3.5 years in duration, a 4-year RIA would become 5 years, etc.⁵³
- c. Providing modular, multiphase funding that allows project to evolve from fundamental to applied stages. Short project timeframes (4 years on the average) can serve to limit continuity, hinder the maturation of key results, and reduce the likelihood of real-world impact. To facilitate progression in the pathways, highly successful projects could be eligible for an additional round of follow-up funding, based on a targeted proposal outlining clear objectives—such as refining Key Exploitable Results (KERs), enhancing technology readiness levels (TRLs), expanding policy engagement, and publishing high-impact findings. The move to lump-sum funding could facilitate this.
- d. Requiring adaptable implementation plans (supported by templates around reporting, etc.) in the context of an extended dissemination plan, would provide clarity and structure to projects. The plan, handled early before commencement of projects could serve as a strategic blueprint, ensuring every consortium member and stakeholder understands the objectives, processes, and responsibilities associated with the project. This could also support collaboration with other projects in the pathway and beyond.

The longer period would allow for more meaningful dissemination KPIs including mandating archiving of outputs in designated EU archives to help quantify impact.

5.1.3. Strengthen linkages between Food 2030 and other initiatives at EU, National and local levels

Strong links to other programmes and processes were shown to be critical to supporting the impact, sustainability and reach of Food 2030 initiatives. There are important high-level food system processes underway and Food 2030 can leverage its findings to better support these. For example, when it comes to climate change, the Intergovernmental Panel on Climate Change identified the EU's previous two Framework Programmes – Framework Programme 7 and Horizon 2020 – as the second most frequently acknowledged funding sources (after the US National Science Foundation) of the research referenced in the 6th Assessment Cycle reports, with over 4500 publications cited. Horizon Europe is on course to achieve similar results.

The Framework Programmes supported the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the International Resource Panel (IRP). Food systems are a critical component across all of these processes and Food 2030 programming can be better communicated and showcased.

How: This can be advanced by:

- a. Undertaking a centralised mapping of relevant processes and initiatives, and facilitating communication and collaboration. The outcomes can be shared with relevant project actors. Further, call texts can be designed with synergies in mind. At the same time, it is critical that Food 2030 continues to be a leader in advancing state of the art

⁵³ Brereton, Pathway 8

topics. Liaison or connecting actors can be identified to communicate Food 2030 findings in a more targeted way.

- b. Strengthening connections to education policies (e.g., integrate with Erasmus+ youth programs for nutrition awareness).
- c. Fostering dialogue and collaboration between European Commission departments and other relevant agencies and organisations.
- d. Facilitate more explicit connections with other, complementary, Horizon Europe work streams.

Better alignment and translation of the insights and outputs of Food 2030 to other domains and scales can lead to much improved awareness and sustain initiatives developed in the context of the Framework Programme. Improved linkages can lead to higher implementation effectiveness, as other policies could support concrete actions to achieve the ambitions of Food 2030. Evidence generated outside of Food 2030 could be taken up within Food 2030, and vice versa. Efforts to scale-out, -up and -deep can lead to an amplified systemic impact.

5.2. Concluding reflections

Food systems are critical to a competitive, sustainable, healthy and secure Europe. In turn, a robust framework for R&I is critical to ensuring a transformation from food systems that lead the transgression of planetary boundaries, to food systems that serve people and the planet.

This evaluation confirms that Food 2030 has a key role to play in advancing R&I to achieve key societal, scientific, political and environmental objectives.

In the context of these objectives, it is recognised that despite the ‘considerable results’ of the Framework Programme, there is a need to simplify procedures and processes. The commitment of the Horizon Europe framework to shape a more simple, focused and impactful programme is welcome and concrete proposals are included in this report to support this effort.

However, it is also critical that the commitment to ‘promote the quality of collaborations’ is not lost, recognising that these are not simple processes. Collaborative research is critical to addressing the wicked problems we now face, and will increasingly face. Food 2030 is a leader in this regard.

While there has been a clear EU-wide mandate towards simplification, **this evaluation calls for caution** and for a reflection on the degree to which the Framework Programme is complex, or complicated. Complicated problems can be hard to solve, but they are addressable with clear procedures. Complicated systems are not necessarily complex, but they are often made so by the presence of unnecessary or redundant elements. Certainly here simplification and coherence are critical to facilitating a stronger R&I ecosystem for Europe.

However, to remain aligned with broader political objectives (e.g. sustainability, competitiveness, etc), and the state-of-the-art of science, **it is critical that R&I, and Food 2030 programming more specifically, embraces complexity.** Complexity refers to the inherent nature of something that is composed of many interconnected parts. The food system (and the systems that it interacts with, such as energy systems, water systems, etc.) are complex. They are, by definition, difficult to understand and predict because they are made up of multiple, interacting elements. In an effort to simplify processes, it is imperative that R&I which aims to make sense of this complexity is fully supported.

The science is clear: narrow, linear approaches are inadequate for addressing the challenges ahead. In turn, embracing the complexity, with supportive, simplified structures, is

critical to achieving the goals of the European Commission. Food 2030 is well positioned to tackle many of these challenges.

6. Methods

6.1. Objectives and methods

The four objectives that guided the design of the evaluation are:

- I. To assess the underlying rationale of Food 2030.
- II. To assess the underlying structure of Food 2030.
- III. To evaluate the output and impact produced by Food 2030, including the value-added for the EU.
- IV. To identify potential gaps and synergies to be addressed by EU research and innovation policy on food systems.

This report is a synthesis of Food 2030 Pathway-specific evaluations conducted by independent experts. For this evaluation, 10 of the Food 2030 pathways were evaluated by nine independent experts. Pathways 1 and 2 were covered by a single expert with cross-cutting expertise. Pathway 11 – ‘Zero pollution food systems’ – was not eligible for evaluation as it was only introduced in 2023.

Throughout this synthesis report, the specific contributions of the independent experts are referenced by the name of the independent expert and the number of the pathway (e.g. Amudavi, Pathway 9).

To facilitate comparison and enhance learning across pathways, a common methodology was developed, validated, and adapted by the experts to suit the specificities of their pathways. To guide the evaluation, five evaluation criteria were identified. The proposed evaluation criteria build on: The evaluation standards of the OECD Development Assistance Committee; The Evaluation methodological guidance for external assistance; The EU institutional framework for effective management of evaluation activities. These criteria align with the guidance of the Evaluation study of the European Framework Programmes for Research and Innovation for a Resilient Europe,⁵⁴ and the Evaluation Policy for European Union Development Cooperation. The criteria were defined and elaborated by a series of questions and indicators that were validated in a face-to-face meeting with all experts.

Three main methods were employed by independent pathway experts.

1. **Desk research and review of literature** including previous evaluations and studies, thematic expert reports, EU institutions reports, project deliverables and other project outputs.
2. **Interviews** (purposive and semi-structured) were a primary source of data for identifying and reviewing the key drivers behind the identified evaluation indicators. An interview guide was developed on the basis of five evaluative criteria and adapted by experts to address knowledge gaps and needs.
3. **Survey:** For some pathways, the interview questions were adapted into open-ended surveys to facilitate broader participation.

⁵⁴ European Commission: Directorate-General for Research and Innovation, IDEA Consult, PPMI, UNU-MERIT, Budraitis, M. et al., Evaluation study of the European framework programmes for research and innovation for excellent science – Horizon 2020 – Annexes, Publications Office of the European Union, 2023, <https://data.europa.eu/doi/10.2777/353383>

Interviews and surveys targeted projects selected on the basis of progress (projects less advanced than midterm were excluded), and diversity (to ensure a range of projects were included, based on topic, funding scheme, methodology). A list of the projects that were considered for analysis is included in Appendix 1.

The expert reports were analysed using an abductive coding approach in Atlas.ti (a qualitative analysis software), beginning with the main objectives of the evaluation as guiding deductive codes. These objectives – underlying rationale, structure, synergies, gaps, impacts and recommendations – served as the initial framework for organising the data.

As the coding progressed, additional codes emerged inductively from the content of the reports, allowing for the identification of unanticipated themes and patterns. This iterative process supported a nuanced interpretation of the findings, balancing predefined evaluative criteria with contextual insights. The use of Atlas.ti facilitated the systematic organisation, retrieval, and comparison of codes across reports, ensuring both analytical rigor and traceability in the coding process. The AI functions of Atlas.ti were not used in the analysis.

6.2. Assessing impact

The challenges and limitations of evaluating impact of R&I are well known.⁵⁵ They include, but are not limited to, timelines, as some outcomes and impacts are unlikely to emerge until after the lifetime of the project itself. Further, while some indicators can be clearly attributed to impact and quantified (e.g. publications, citations, patents, number of events, etc.), others are much harder to quantify (e.g. behavioural changes and longer-term societal, technical, ecological or economic impacts). In this report, an effort was made to capture these impacts qualitatively.

Perhaps the biggest challenge is that of attribution: whether the claimed impact can be fully, or even in part, attributed to a specific programme or pathway. Without a comprehensive benchmarking exercise, this becomes even more challenging. It is also of note that unintended effects are hard to predict, identify and monitor and thus a comprehensive evaluation of impact demands an open and exploratory approach, beyond the scope of this assignment. It is therefore more appropriate to speak about contribution and not attribution of an intervention to long-term outcomes and impacts.⁵⁶ These challenges also underline the relevance of Recommendation 9.

⁵⁵ ERA-LEARN, “Challenges of Monitoring and Evaluation of Partnerships in R&I,” ERA-LEARN, 2025, https://www.era-learn.eu/support-for-partnerships/governance-administration-legal-base/monitoring-and-evaluation-of-european-r-and-i-partnerships_the-ripe-toolkit/monitoring-and-evaluation-basics/using-the-results-of-the-evaluation-of-partnerships-in-r-i/challenges-of-monitoring-and-evaluation-of-partnerships-in-r-i.

⁵⁶ ERA-LEARN.

7. Appendices

Appendix 1 Overview of outputs of the projects by pathway

PW	Project	Type of Action	Outputs
Governance for Food Systems Change	FIT4FOOD2030 - Fostering Integration and Transformation for FOOD 2030	CSA	• 2 Peer-reviewed publications • 25 Living Labs (or similar mechanisms) established • Handbook to support the setting up and activities of a Policy Lab • Toolkit for the use of 18 educational modules • Sustainable Food Systems Network
	SUSFANS - Metrics, Models and Foresight for European Sustainable Food and Nutrition Security	RIA	• 19 Peer-reviewed publications • Toolbox for assessing sustainable FNS in Europe, centred around the implications of the current diet for the sustainability of production and consumption in the EU, and the options for the EU agri-food sector (including fisheries and aquaculture) to improve diets in the near future (up to 5 years) and in the long run (one or more decades ahead).
	FOSTER - Fostering food system transformation by integrating heterogeneous perspectives in knowledge and innovation within the ERA	RIA	• Four Summer Schools for citizen science, Digital portal and a repository of food system science
	FOODPathS - Co-creating the prototype 'Sustainable FOOD Systems PArTnersHip'	CSA	• 4 Peer-reviewed publications • Network of funding organisations
	CLEVERFOOD - Connected Labs for Empowering Versatile Engagement in Radical Food System Transformation	CSA	• Food 2030 Multi-actor and Public Engagement Toolkit and Manual • FOOD 2030 Project Collaboration Network • FOOD 2030 Connected Lab Network
	FoSSnet - Pan-European Food Systems Science Network	RIA	• Academic network focused on inter- and trans-disciplinary food system science
	Infoodmation - Optimising food information and communication towards healthier and more sustainable dietary patterns	CSA	
	FutureFoodS -European Partnership for a Sustainable Future of Food Systems	Cofund	
	Vision4food - Envisioning an integrated quadruple helix and RRI framework for food system transformation and regional innovation ecosystem enhancement	CSA	• 5 Living Labs (or similar mechanisms) established
	RefreSCAR – Improved Coordination of National and European Bioeconomy Research and Innovation	CSA	

	Programmes in the ERA through Strengthening SCAR Working Groups		
Urban Food Systems Transformation	FoodE- Food Systems in European cities	IA	• 61 Peer-reviewed publications • 11 Living Labs (or similar mechanisms) established • Classification of CRFS business models, European guidebook to sustainable city-region food systems, Online app to mobilise and interconnect users and stakeholders
	FoodSHIFT 2030 - Food System Hubs Innovating towards Fast Transition by 2030	IA	• 7 Peer-reviewed publications • 36 Living Labs (or similar mechanisms) established • Info package on good practices and evaluation criteria for citizen-driven food systems, FoodShift2030 Interactive Network, Job creation platform (demonstrator), Transition toolkit (web app) for city-regions towards a low-carbon, circular and more plant-based food system (demonstrator), Citizen empowerment scheme (demonstrator)
	FOODTRAILS- Building pathways towards Food 2030-led urban food policies	IA	• 1 Peer-reviewed publications • 11 Living Labs (or similar mechanisms) established • Impact measurement framework for investors to evaluate their contribution to food policies
	CITIES2030 - Co-creating resilient and sustainable food systems towards FOOD 2030	IA	• 12 Peer-reviewed publications • 20 Living Labs (or similar mechanisms) established • Observatory on sustainable urban food policies and practices (web platform), Capacity-building programme for technology-related and social innovations for city-regions, Policy co-creation capacity-building programme
	FUSILLI- Fostering the Urban food System Transformation through Innovative Living Labs Implementation	IA	• 18 Peer-reviewed publications • 12 Living Labs (or similar mechanisms) established • Online knowledge platform to realise integrated urban food governance, ICT tool for behavioural change- social game developed through a mobile app to encourage citizens to adopt a healthy diet and contribute to food system transformation
	FoodCLIC- Integrated urban FOOD policies developing sustainability Co- benefits, spatial Linkages, social Inclusion and sectoral Connections to transform food systems in city-regions	IA	• 2 Peer-reviewed publications • 8 Living Labs (or similar mechanisms) established • Food Sustainability Tool to assess the GHG emissions of food production and consumption patterns
	CULTIVATE - Co-Designing Food Sharing Innovation for Resilience	IA	• European Food Sharing Dictionary (translated into 25 languages), Three serious games prototypes for citizen engagement
	CUES- Consumers' Understanding of Eating Sustainably	RIA	
	TealHelix- Building Resilience Through Inclusive and Personalized Food Labelling	RIA	
	DietWise- Systemic Solutions to Enhance Healthy and Sustainable Food Provision and Cooking at Home	IA	

Food from Oceans and Freshwater Resources	WiseFood - Leveraging data and AI to empower citizens to make healthier and more sustainable food choices	IA	
	REDESIGN - Transformative Food Value Systems reshaping resilient urban landscapes	IA	• 3 Living Labs (or similar mechanisms) established
	BAUHAUS BITES – Positive Food Environments Fortified with Nature-Based Solutions and New European Bauhaus	IA	• 7 Living Labs (or similar mechanisms) established
	PANDORA - Paradigm for Novel Dynamic Oceanic Resource Assessments	RIA	• 40 articles, 5 open genomic datasets, 5 training courses and e-learning modules targeting different audiences • Advanced management strategy evaluations/ simulations to account for higher ecological complexity • The results from CERES project were used • Genetics catalogue for the separation of commercial fish species all over Europe
	MEESO - Ecologically and economically sustainable mesopelagic fisheries	RIA	• 39 articles, 14 acoustic and biotic open access datasets in ICES Acoustic Trawl Data portal, 48 metadata records in ICES system • 4 videos covering important aspects of best surveying and survey fishing practices • E-learning courses • The first estimates of Maximum Sustainable Yield (MSY) for two key species (<i>Maurolicus muelleri</i> and <i>Benthoosema glaciale</i>). • Regional maps of mesopelagic biomass distribution. • Feeding ecology, trophic interactions, and the role of the mesopelagic zone in carbon sequestration.
	SUMMER - Sustainable management of mesopelagic resources	RIA	• 81 articles, 127 open access datasets, 16 data collections and 3 containing software/code at PANGAEA, NMDC, UTM-CSIC, Zenodo and figshare • Identification of dominant species in the northern Mid-Atlantic ridge and the development of a nested-bootstrapping method to reduce uncertainty in biodiversity estimates. • Unique biochemical traits were identified in the mesopelagic microbial community, opening the way to new pharmaceuticals.
	EcoScope - Ecocentric management for sustainable fisheries and healthy marine ecosystems	RIA	• 36 articles, 4 book chapters • 5 videos presenting the outputs and tools of the project in YouTube • Methods for evaluating fisheries management scenarios using static (Ecopath), temporal (Ecosim) and spatial (Ecospace) simulation models (EwE) • Marine Spatial Planning Challenge Software • Ecosystem indicators available on the EcoScopium public portal
	SEAWISE - Shaping ecosystem-based fisheries management	RIA	• 20 articles • Predictive models for evaluating the productivity of commercial stocks, based on an understanding of the impacts that environmental and ecological changes may have upon them. • Models to understand the impacts of different fisheries management strategies on fish stocks, and environmental status under different climate and

			fishing scenarios. • Spatiotemporal effects of bottom fishing on benthic habitats • Risk of mortality of threatened and endangered species by-catch • Evaluation of the impacts of management measures in place to create evidence-based recommendations
	FUTUREEUAQUA - Future growth in sustainable, resilient and climate friendly organic and conventional European aquaculture	IA	• 12 publications, 14 theses and dissertations, 3 prototypes of fish-based food products • Novel, sustainable feeds using alternative ingredients like insect meal and algae, showing promising growth results across several species. • Non-invasive fish biomass estimation systems using stereo vision and machine learning. • Wireless sensor networks for real-time monitoring of environmental and fish welfare parameters. • Non-destructive texture evaluation tools for fish freshness.
	IFISHIENCI - Intelligent Fish feeding through Integration of ENabling technologies and Circular principle	IA	• 6 publications, 7 theses and dissertations, 2 software and 8 datasets open in Zenodo • Fish-Talk-To-Me encompasses fish tagging technology for continuous gathering of fish physiological data, camera technology for automatic assessment of fish behaviour, echo-sounders, and a digital twin of fish digestion efficiency (FishMet). • iBOSS platform: A smart, integrated system for monitoring and feeding fish using IoT and AI, increasing feed efficiency and fish welfare • SmartRAS: iBOSS deployment in RAS • Business models showcasing value from waste (e.g., valorisation of RAS sludge and use in bio-based industries). • Demonstration in sea-based fish farms, ponds, flow-through and high-tech RAS. • Policy recommendations
	NewTechAqua - New Technologies, Tools and Strategies for a Sustainable, Resilient and Innovative European Aquaculture	IA	• 20 publications, 6 datasets open in Zenodo, 2 biosensor prototypes. The Spanish Algae Biobank • Prediction models for specific diseases, kits for disease' detection and genomic selection strategy for shellfish pathogens. • The biofloc technology (BFT) that is based on the ammonia decomposition by heterotrophic bacteria forming bioflocs, and the ELOXIRAS technology that by means of electrochemical oxidation guarantees the oxidation of excretion nitrogenous compounds in water were compared for rearing grey mullet. • Pilot use of the dynamic mathematical model in the Il Vigneto farm, located in Tuscany, Italy to support the production of European seabass (<i>Dicentrarchus labrax</i>) and gilthead seabream (<i>Sparus aurata</i>). • Studying the reproductive cycle of emerging fish species (Senegalese sole, greater amberjack, meagre) and microalgae to support species diversification • Non-thermal sanitation of oysters • European seabass diets based on microalgae and by-products from fisheries and aquaculture
	AQUAIMPACT - Genomic and nutritional innovations for genetically superior farmed fish to improve efficiency in European aquaculture	IA	• 37 publications, 4 datasets open in figshare, 3 training courses, 1 commercial software prototype (FEEDNETICS) • The methods developed are generic and can be applied to assess any species' requirements for

			macronutrients, amino acids, vitamins, and minerals.
	SAFE- SmartAqua4FuturE	RIA	• 1 article, 2 international partners • Impact of SAFE interventions in 3 farms on the aquatic biodiversity using bioindicator tests • Characterisation and quantification of FW aquaculture waste streams • Low energy technology to convert fish sludge into solid bio-fertiliser • Alternative fish feed ingredients (diatoms, mealworm, redworm, mushrooms) grown on collected farm wastes. • Low footprint feeds with circularly sourced ingredients for established European freshwater farmed fish • GHG emissions of FWA practices, feed production and waste management measured
	AWARE- Aquaponics from WAstewater Reclamation	RIA	• Infrastructure development for pilot in the town of Fasano (Puglia, Italy): • Advanced tertiary treatment linked to the aquaponic RAS constructed; field site preparation completed; aquaponic RAS installed and operational in Castellana Grotte; advanced biofilter prototype constructed and initial experiments completed.
	IGNITION- Improving Green Innovation for the blue revoluTION: new tools and opportunities for a more sustainable animal farming	RIA	• 3 articles • Study the stress caused by fish handling during vaccination and transport (acute stress) and by rising temperatures and lower salinities due to raining pitfalls (chronic stress) • Discovery of new non-invasive biomarkers of health and welfare • Novel antigen delivery systems to develop improved subunit vaccines able to protect against multiple diseases, resulting in less fish handling, improved fish welfare and lower production costs. • Genetic component of individual animal response to stress, pathogens, immunisation.
	Cure4Aqua- Curing EU aquaculture by co-creating health and welfare innovations	RIA	• 4 articles • Alternatives to pharmaceutical treatments • 11 vaccines for five key fish pathogens in 4 fish species • Epimarket panels for selective breeding and farm monitoring • Phage and probiotics application for pathogen control, antimicrobial peptides (AMD) applications and passive immunisation • Predictive model building using AI, non-invasive reproductive and stress hormone monitoring, new diagnostic biomarkers and rapid low-cost on-farm diagnostic tests, novel laboratory diagnostics standards • Fish welfare standards that consider different life stages, production systems and knowledge of welfare needs.
	AQUAVITAE- New species, processes and products contributing to increased production and improved sustainability in emerging low trophic, and existing low and high trophic aquaculture value chains in the Atlantic	RIA	• 23 articles, 100 datasets open in Zenodo, A tasting event was organised to showcase food from low-trophic species • 13 case studies to explore novel low-trophic species (macroalgae, abalone, sea cucumber, sea urchin); oysters and mussels; new fish species in Brazil; low trophic aquafeeds; novel IMTA schemes • Guidelines for performing health-risk benefit assessment of low trophic species products • New sensors and IoT platform for IMTA data

			integration and analysis • Educational material and game • Recommendations for low-trophic aquaculture policy framework.
	ASTRAL - All Atlantic Ocean Sustainable, Profitable and Resilient Aquaculture	RIA	• 17 articles, 47 datasets open in Zenodo • 5 IMTA labs in Argentina, Ireland, Brazil, Scotland, South Africa • New digital tools and sensors for IMTA • Validated cost-effective IMTA processes • Identification of new species for IMTA • Identification of potential environmental discharges of micron-sized plastic fragments – microplastics (emerging pollutants) within IMTA recirculation inshore systems. • Network of knowledge generation and exchange across the Atlantic
	ULTFARMS - Circular Low Trophic offshore Aquaculture in wind farms and Restoration of Marine Space	IA	• Six (6) Pilot demonstrations of low-trophic (seaweed, bivalves) aquaculture in offshore wind farms • New cultivation structures and grow-out systems • Integrated monitoring and management platforms using existing forecasting systems • Collaboration with sister projects (UNITED, OLAMUR, AQUAWIND)
	OLAMUR - Offshore Low-trophic Aquaculture in Multi-Use Scenario Realisation	IA	• Three (3) pilot demonstrations of semicommercial scale where seaweed and blue mussels will be grown within wind farms or in the vicinity of a trout farm. • A robotics and model-based monitoring, forecasting and assessment capacity for enabling corresponding services for aquafarms and decision makers • A data-based service system for policymakers for knowledge-based decisions
	BLUEBIO - ERA-NET Cofund on Blue Bioeconomy – Unlocking the potential of aquatic bioresources	ERA-NET	• 49 projects funded • Examples include but are not limited to BlueBiochain and SIDESTREAM, use wastewater to grow microalgae for fish feed, cosmetics and food additives and side streams to produce polychaetes and crustaceans to produce omega-3 lipids. • SuMaFood, Aquaheal3D, BlueCC, SureMetS, IMPRESSIVE, MIVERNA, MARIKAT have worked to enhance circularity in aquaculture through the development of green processing methods and the discovery of novel enzymes to retain valuable nutrients or bioactive compounds for downstream use in health applications, food and feed.
	FishEUTrust - European integration of new technologies and social-economic solutions for increasing consumer trust and engagement in seafood products	IA	• 2 articles, 5 videos • List of projects and catalogue of Research Infrastructures and Living Labs of Interest to FishEUTrust CLLs • Five (5) Co-creation Living Labs (CLLs) in the Mediterranean Basin, the North Sea and the Atlantic Sea. • EU Cluster for Food Traceability and Trust Sensors, a suite of tools integrating metagenomics, genetic biomarkers, isotopic techniques, and digital technologies (labelling, Product Passport/Blockchain). • Demonstrations to test and validate digital and non-digital supply chain solutions
	SeaMark - Seaweed based market applications	IA	• Active involvement of 12 companies • New breeding technologies for increased yield • Novel processing methods like fermentation and biotransformation

Altern ative Protei			• Prototypes for large scale and automated seeding, harvesting and landing technologies • Effect of seaweed intake on the gut microbiome and immune and inflammatory biomarkers in sows
	REALM- Reusing Effluents from Agriculture to unLock the potential of Microalgae	IA	• 15 articles, 4 SMEs • Two validation facilities installed in the Netherlands and Finland, and two demonstration facilities deployed in Portugal and Spain to grow algae in nutrient-rich drain water of soilless greenhouse cultivation • Profile of nutrient content of drain water from greenhouses • Selection of suitable microalgae strains • Novel sensors to monitor the growth and physiological state of microalgae in real-time. • Business model for the installation of multiple microalgae production facilities, next to soilless greenhouses, and connected to a centralised processing facility.
	CIRCALGAE- CIRCular valorisation of industrial ALGAE waste streams into high-value products to foster future sustainable blue biorefineries in Europe	IA	• 4 articles, 1 dataset, 4 reports open in Zenodo, 14 companies • Three (3) blue biorefinery schemes to process algae waste streams • 12 demonstrator products, including vegan foods, protein-rich feeds, and cosmetics • Optimisation of the extractions from algae by-products and streamlining the processes • Characterisation of bioactive ingredients • Regulatory aspects of the new ingredients and products • Assessment of sustainability and economic viability • Consumer acceptance of algae consumption and its derived end products.
	LOCALITY- Nature-positive aLgae-based fOod, agriCulture, AquacuLture and textile producTs made in North and Baltic Sea ecosYstems	IA	• 16 companies, 5 digest articles • Three (3) regional ecosystems positioned in the Baltic and North Sea bordering countries • Harvest up to 500kg of dry seaweed or cyanobacterial biomass from the Baltic and North Sea • Three alternative protein substitutes (meat, fish and egg analogues), two nutraceuticals, one aquafeed ingredient, two agricultural products, and two textile additives • Quantitative LCA comparing available data of already existing and newly developed products or ecosystem processes. • Assessment of consumer readiness for the designed products
	AlgaePro BANOS- Accelerating algae product developments in Baltic and North Sea	IA	• 9 companies • Six (6) business pilots based on microalgae and seaweeds, sourced in the Baltic or North Sea or from recycled resources • Pre-clinical research on the health effects of selected algae-based bioactive compounds • Nutritional value, sensory acceptance, and market feasibility of algae-based snack • Three online dashboards for algae farms, algae products, algae logistics • A decision-support tool for biorefineries and value chains
	NEXTGENPROTEINS- Bioconversion of underutilized resources into	IA	• 54 publications (5 scientific publications, 5 popular publications) • One of the most important outputs of the project was the development and production of microalgae,

next generation proteins for food and feed		insect and SC proteins and their production optimisation and upscaling. • A database with proximate, amino acid, minerals and fatty acid composition and results on the digestibility of the proteins, as well as on the potential existence of toxins and allergens was set up. the database also contains information on the functional properties of the alternative proteins. • The sensory properties were tested and improved as much as the production processes allow, for eventual application as new ingredients in food and feed products. • The application potential of the proteins for food and feed was demonstrated. -Many food prototypes were developed by the food industry partners. the proteins have been showcased in ready-meals, bread, snacks, emulsion products and drinks. -The results from poultry feeding and seabream/salmon feeding trials were assessed and evaluated.
SUSINCHAIN- Sustainable Insect Chain	IA	• More than 60 publications • On 20 January 2025, the Commission authorised the placing on the market of UV-treated powder of whole <i>Tenebrio molitor</i> larvae (yellow mealworm) as a novel food. It is intended to be marketed as a food ingredient in several food products for the general population. • Prototype: Optimisation suggestions for a small industrial low energy electron beam unit for insect treatment • RF equipment working • A database of substrate pre-treatments was constructed, and feed experiments performed. • Incorporating insect-based proteins into everyday diets as an alternative to meat rely on investing in food innovation, recognising food cultures, understanding consumer expectations and openness to new foods, as well as openness to embracing sustainable eating habits. • Chemical contaminants, pathogens and allergenicity have been investigated. • In terms of sustainability, the results of the project provided a systematic overview of environmental impacts of several insect species, performed with a single methodology for multiple scenarios, allowing for the selection of optimal sustainable production chains. • Results for the use of insect meals in feed show that globally, insect meals are suitable protein sources that well sustain animal growth. Results were dependent on animal species, insect source, and age of the animals. • For insects as food, 6 dinner products were developed, and consumer studies were done in Denmark and Portugal.
PROFUTURE- Microalgae protein ingredients for the food and feed of the future	IA	• 19 Publications • Microalgae have been included in feeds, in addition to and/or as a replacement for the protein ration, used in poultry farming (broilers), piglets, shrimp and fish (carp, African catfish, 10 and 20 percent microalgae in feeds). With results: – very promising in piglet breeding (with unicellular <i>Nannochloropsis</i> proteins),

			– equally positive on fish (<i>Vitafort. Nannochloropsis</i> for carp, <i>Chlorella</i> for African catfish), – not as favourable with chickens (due to slower growth rate and yellowing of meat and skin), – awaiting results on shrimp. However, costs, predictably, are not competitive with international GMO soybean listings. • The ProFuture EU research project has made it possible to complete the goals set, and to open important perspectives on a high-potential supply chain in the context of the blue bioeconomy. A model of sustainable development of particular use in contributing to the Sustainable Development Goals related to food security (#sdg2), nutrition security (#sdg3), sustainability of production and consumption (#sfg12), climate change mitigation (#sdg13), protection of aquatic ecosystems (#sdg14) and terrestrial resources (#sdg15). • Final conference- Pushing innovation all along the microalgae value chain • The results of the life cycle assessment and life cycle costing conducted within the framework of the ProFuture research project are presented in one report. Different cultivation and drying options were evaluated for the algae species <i>A. platensis</i>, <i>C. vulgaris</i>, <i>T. chui</i> and <i>N. oceanica</i>. Nine different foods and four different feed products were enriched successfully with microalgae.
	SMART PROTEIN- Smart Protein for a Changing World. Future-proof alternative terrestrial protein sources for human nutrition encouraging environment regeneration, processing feasibility and consumer trust and acceptability	IA	• 30 publications (Systematic reviews have been completed on the effect of behavioural (nudging) interventions on plant-based food consumption, and social media and food consumer behaviour. A consumer intervention study was carried out exploring the effects of additional taste and texture labels on plant-based food choices and consumption. The Pan-EU Survey on the readiness to adopt a plant-based diet was developed and implemented, and a detailed report produced on its findings.) • Fungus fermentation was optimised to repurpose by-products upcycled from pasta (pasta residues), bread (bread crust) and beer (spent yeast and brewery spent grain). -Structure- and flavour-modifying techniques were then used to increase the digestibility and consumer acceptance of the food items. In several foods, the team were able to use less-refined food ingredients, ensuring the inclusion of key minerals and vitamins otherwise lost during protein extraction and processing. -Food industry validation and demonstration tests assessed the feasibility of this innovative food production process and the quality of the resultant products. -Another promising result was the demonstration of soil rejuvenation, thanks to regenerative agricultural practices such as using microalgae and insects. -An output from these networking efforts was a policy brief outlining the key actions for the EU to hasten the necessary dietary transition. The brief has been considered by several -European Commission Directorates-General, including AGRI, GROW and SANTE. -Trials have been conducted on the Smart Protein

		crop varieties (quinoa, lentil, chickpea, fava bean) at seven pilot farms across Europe (IE, PT, DK, NL, PL, ES, IT). An initial report was produced describing the climatic and agronomic characteristics of each pilot farm, and recommendations for subsequent growing seasons. A second report was produced assessing the cultivars at the different growing sites with respect to crop adaptability, yield, quality, susceptibility to pathogens, etc. This work will help inform the most suitable protein crops to be grown at different geographical locations in Europe. • Literature reviews have been produced to consolidate knowledge on plant protein-based alternative food products. Industrial suppliers have been identified for ingredient outsourcing, and product benchmarking of the commercially available plant-based alternatives has taken place. Ingredients have been characterised for their compositional and techno-functional properties, and several fermentation trials have been performed on foods enriched with plant-based products, as well as on raw materials, to produce novel products. Process optimisation on meat substitutes using low moisture extrusion has been performed with benchmark ingredients; high moisture extrusion technology will be trialled soon. • Assessment of digestibility of several ingredients (e.g. red lentil protein isolate, pea protein isolate, fungal mycelia), using in vitro digestion and peptide profiling, has been performed. The experimental design for analysis of four individual proteins simultaneously using the SHIME model has been finalised. Ethical approval has been sought for the human intervention study to take place on the effects of plant proteins on recovery after physical exercise. • Discussions have taken place with project partners from academia and industry on the topic of business development. Secondary market data involving the Smart Protein target food products have been analysed to better understand the current market context. Literature in food laws, regulations and constraints (particularly for novel food products) is being reviewed on a continuous basis. Online workshops with subject matter experts are held for consortium partners on business development and food regulations. • Two literature reviews have been performed: the first was on life cycle assessment (LCA) and life cycle costing (LCC) in agri-food systems to gain insights into the methodological requirements necessary to conduct the ecological and economic study among farmers on the project; the second was on farmers' intent to adopt novel crops, grains, legumes and innovative technologies. Preliminary LCA screening activities for the individual processing phase have been completed. Presentations have been delivered at several LCA related conferences.
	GIANT LEAPS- Gap resolution in safety, Nutritional, allergenicity and Environmental	RIA • 7 peer reviewed publications have been generated, many more coming, various non-scientific publications, public deliverables, etc. • Active stakeholder network was newly formed and

	assessments to promote Alternative Protein utilization and the dietary Shift		connected with existing networks (private and scientific) • Active contributions to the H4P network and efforts to keep it active and growing • Pilot products with alternative protein sources are being developed • the project setup aims to look at all relevant expertise and actors in the food system downstream from the level of protein ingredients (so excluding primary production) to accelerate the dietary shift • this is most relevant and concrete for stakeholder engagement activities in WP1 and environmental sustainability & climate analyses in WP5. In sustainability analyses (environmental LCA, social LCA and LCC) the whole value chain and related actors are included in analyses. • For aspects outside the scope of the project (e.g. primary production) we try to collaborate with other projects (e.g. VALPRO Path) • (Various manuscripts describing project results were submitted to peer-reviewed scientific journals, two have been accepted for publication, and GIANT LEAPS objectives and results were disseminated in numerous scientific conference presentations. A special session was held at the 2023 EFFoST meeting in Valencia, featuring six scientific presentations and a panel discussion. Additionally, six practice abstracts were published. Introduce EU-wide definitions of vegetarian and vegan food products. Establish an EU Front-of-Pack Sustainability Labelling scheme. • Functional natural ingredients) • (Policy brief - Allow conventional denominations for plant-based products. A protocol for data collection and an ontology for data integration were created to ensure that the data generated in the WPs can be captured and integrated successfully into the Data Platform, as well as data from project-external sources. The Data Platform is designed, currently in alpha version, to make the data openly available and accessible by the end of the project.)
	LIKE-A-PRO- From niche to mainstream alternative proteins for everybody and everywhere	IA	• Key determinants, motivations, opportunities and demographic factors impacting consumers' behaviour and choices were identified. An evidence-based typology of barriers and facilitators within various built environments was created, highlighting regional differences across the EU. • 17 system maps for 13 EU countries were co-created with stakeholders to identify leverage points that encourage alternative protein choices. (Current food consumption in 28 European countries was analysed to evaluate nutritional adequacy and quality, and environmental sustainability. Results were grouped to represent North, East, South and West regions in Europe. Four scenarios were developed and indicators for health and environmental impact were selected that will be used to define future optimised diets.) • Protein extraction and processing methods from various sources were optimised enhancing efficiency, reducing undesirable compounds and addressing sensory issues. Advancements were made in scale-up of ingredients production and protein quality assessments (amino acid profiles, digestibility, antinutrient factors). The technological

			properties of the ingredients were evaluated, and small batches of food products developed. • The operational framework for implementing Food Environment Citizen Innovation Living Labs across 11 EU countries was developed including defining visions, mandates, thematic focuses, target groups, implementation timelines and operational procedures. • A strategy for citizens' recruitment and engagement was developed. • A socio-environmental assessment of conventional proteins was also conducted using the True Price methodology (serve as a basis for the alternative proteins assessment). • Economic impacts of alternative protein developments were monitored and analysed through market trends and comprehensive audits to understand market penetration and pricing strategies. • A review of EU food safety regulations ensured compliance for alternative proteins. • A methodology was developed to assess safety and novel status of proteins focusing on allergenicity, toxicity and digestibility. (Alternative protein ingredients derived from the project's shortlist were distributed between Consortium partners. Techno-functional and sensory characteristics were analysed for all ingredients (20 in total) and results will inform next steps to functionalise the proteins and create food prototypes. A first screening of the in-vitro digestibility of eight protein ingredients was performed and five protein sources were selected to create risk assessment scenarios for a safety-by-design approach. These risk assessment scenarios are being prepared for publication after expert and stakeholder consultations.) • Data management practices and ethical guidelines were implemented to ensure compliance with ethical standards.
Food waste and resource-efficient food systems	SCALIBUR - Scalable technologies for bio-urban waste recovery	IA	• Sensor-equipped containers, improved monitoring • Biowaste governance through stakeholder hubs • Biowaste valorisation (e.g., Black Soldier Fly, anaerobic digestion) • Citizen campaigns for biowaste sorting • Reduction of landfill waste; valorisation reduces GHG and pollution from organic waste
	Circular Agronomics - Efficient Carbon, Nitrogen and Phosphorus cycling in the European Agri-food System and related up- and down-stream processes to mitigate emissions	RIA	• GHG/ammonia emissions linked to nutrient recovery • Policy recommendations on nutrient loops and sufficiency • Precision farming, fertilisation, digestate treatment • 3A approach (Attitude, Acceptance, Awareness) • Measured reductions in ammonia and GHG emissions; improved soil health through organic amendments
	REFRESH - Resource Efficient Food and dRink for the Entire Supply cHain	RIA	• Measurement at national levels through Vas, guidelines for HH and retail measurement • EU roadmap, Detailed hierarchy of approaches categorised within waste pyramid, White papers on food policy, policy briefs on key topics (unfair trading practices, consumer behaviours, business engagement, FLW valorisation) • VA blueprint, tech guidelines for valorisation, LCC and LCA tools, methods of assessing consumer in-

			home food waste • Research in the field of social norms and associated scientific frameworks to change behaviours • FORKLIFT: Assessing climate impacts and costs of using food side streams.
	SISTERS- Systemic Innovations for a Sustainable reduction of the European food waste	IA	• Consumer behaviour data, FLW reduction metrics • Retail and consumer behaviour incentives • Smart containers, bio-based packaging, digital labelling • Behavioural nudges via smart labelling • Packaging innovation reduces plastic and spoilage-related emissions
	ZeroW- Systemic Innovations Towards a Zero Food Waste Supply Chain	IA	• Systemic Innovation Living Labs, data platform • Policy engagement through Living Labs • Decision support tools, FLW-GHG labels • Diet planning, food bank optimisation, citizen engagement • Explicit aim to cut food waste and reduce GHG emissions (by up to 20%)
	FOLOU- Bringing knowledge and consensus to prevent and reduce Food Loss at the primary production stage	RIA	• FL measurement manual, FL registry, tech trials • Engagement with policymakers, Twinning Regions Programme • Measurement technologies (UAVs, blockchain, etc.) • Consumer training via eLearning courses • Sustainability quantification tools developed (LCA, SLCA, LCC frameworks)
	WASTELESS- Waste quantification solutions to limit environmental stress	RIA	• Harmonised measurement methods and ontology tools • White Book on FLW legislation and business strategies • Digital Decision Support Toolbox • Stakeholder involvement and training in measurement • Designed to support EU-wide environmental monitoring and FLW policy alignment
	ToNoWaste- Towards a new zero food waste mindset based on holistic assessment	RIA	• Holistic assessment methods including impact KPIs • Decision-making framework co-created with stakeholders • Impact KPIs, open-access platform • Framework to influence consumer and business behaviour • Environmental impact measurement with LCAs
	CHORIZO- Changing practices and Habits through Open, Responsible, and social Innovation towards Zero food waste	RIA	• Social norms and behaviour analysis related to FLW • Guidelines to inform policies on social norm transformation • CHORIZO Insider open datahub • Behaviour change driven by social norm intervention • Aims to reduce embedded environmental costs of waste
	FOODRUS- An innovative collaborative circular food system to reduce food waste and losses in the agri-food chain	IA	• Monitoring through pilot projects and circular model data • Cross-sector governance models in food chains • Circular economy toolkits and best practice guides • Education and awareness for consumers and food businesses • Demonstrated circular models for reduced emissions and resource recovery from food waste
	CIRCLES- Controlling Microbiomes circulation for better food systems	IA	• Pilot trials with producers • Technical deliverables and peer-reviewed publications (Developed and tested microbiome-based interventions in six food chains)

The microbiome world	MASTER- Microbiome Applications for Sustainable food systems through Technologies and Enterprize	IA	• KERs listed in Innovation Radar • Databases and toolkits shared. (Created food chain microbiome monitoring tools; registered exploitable results)
	HOLOFOOD- Holistic solution to improve animal food production through deconstructing the biomolecular interactions between feed, gut microorganisms and animals in relation to performance parameters	IA	• Data platforms published • Prototypes tested with industry. (Applied multi-omics to poultry/aquaculture; created industry-usable platforms.)
	SIMBA- Sustainable innovation of microbiome applications in food system	IA	• Living lab testing in agriculture and aquaculture • Stakeholder interviews (Developed microbial consortia for sustainable food and feed systems.)
	MicrobiomeSupport- Towards coordinated microbiome R&I activities in the food system to support (EU and) international bioeconomy goal	CSA	• Published SRIA, policy briefs, stakeholder maps. (Structured global microbiome R&I agenda; policy coordination tools)
	3D-Omics- Three-dimensional holo'omic landscapes to unveil host-microbiota interactions shaping animal production	RIA	• Scientific protocols and open-access publications (Created spatially resolved multi-omics workflows for microbiome research)
	SymbNet- Genomics and Metabolomics in a Host-Microbe Symbiosis Network	CSA	• Training events, publications, inter-institutional networks (Strengthened systems microbiology research capacity through twinning)
Nutrition and sustainable healthy diets	HealthFerm- Innovative pulse and cereal-based food fermentations for human health and sustainable diets	RIA	• Human intervention studies • Engagement with food SMEs. (Explored health benefits of fermented foods via microbiome pathways)
	SWITCH- Switching European food systems for a just, healthy and sustainable dietary transition through knowledge and innovation	RIA	• Data Lake, which will collect and integrate relevant nutritional and sustainability data on regional food production and consumption, web app of the SWITCH Food Explorer of food sustainability and nutritional, Digital Hub Experience (DHE). The DHE is the central landing point composed of three apps or web apps, targeted at citizens, chefs and policy makers respectively • A new synthetic index of food sustainability was produced, together with database containing quantitative sustainability and nutritional data • Policy briefs for integrating sustainable diets into local policies
	FEAST- Food systems that support transitions to healthy and sustainable diets	RIA	• 'Hub City', has been supported to create a web and mobile app to reduce food waste in Milan • Toolkits for local food policy development • Living Labs will work to co-develop local catalogues of best practices, Mapping and Monitoring factors that shape food environments will use the Business Impact Assessment (BIA) tool on Obesity and BIA Sustainability tool to explore the role of business in shaping food environments in 5 countries
	PLANEAT- Food systems transformation towards healthy and sustainable dietary behaviour	RIA	• Open-access database "European Database of the True Cost of Food" (working title) was prepared • Improved personalised dietary advice and communication strategies to target populations at large. Sustainable meal plans and recipes. True

			Cost Accounting of food and diets on individual and country level. • A Food System Dashboard, setting out context-specific food policy recommendations
	NUTRISHIELD - Fact-based personalised nutrition for the young	IA	• Peer Reviewed Publications: 17 • Personalised nutrition assessment tools (NUTRISHIELD Dashboard is a website aimed at providing personalised nutrition suggestions to end users; NUTRISHIELD App: The application "Platemate" representing nutrition in visual recognisable way.) • Biomarker-based dietary recommendations • Reports on personalised nutrition strategies • The NUTRISHIELD human milk analyser -A laser-based milk analyser for the measurement of the total protein; Breath analyser; A kit to test microbiome of infant and mother faeces as well as human milk. • Utilises omics technologies including genome expression and microbiome analysis'; Polygenic risk score
	STOP - Science and technology in childhood obesity policy	RIA	• Peer Reviewed Publications: 56 • To expand and consolidate the multidisciplinary evidence base upon which effective and sustainable policies can be built to prevent and manage childhood obesity. • Computer-based policy simulation model, Health-GPS, was developed to estimate the future health and economic impact of childhood obesity policies planned for implementation in EU countries; Ministep app for management of obesity. Parent support programme; mobile health (mHealth) programme (the MINISTOP application) • Multi-country RCT of a behavioural intervention aimed at reducing BMI in young children with obesity, delivered to families in primary care settings, utilising biomarker data • New evidence regarding the impact of different policies including tax policies, front-of-package labelling, marketing regulations, food reformulation, school-based interventions and it analysed the network of stakeholders, their positioning and their attitudes towards childhood obesity policies; kindergarten-based BMI measurement and data collection protocol • Frameworks for national obesity prevention programs • Incorporates epigenetics, metabolomics and proteomics to identify biomarkers predictive of childhood obesity
	CO-CREATE - Confronting obesity: Co-creating	RIA	• Peer Reviewed Publications: 43 • Youth engagement platforms for policy development • MOVING & NOURISHING database on food and nutrition policies; two comprehensive policy indexes for nutrition and physical activity in Europe; Visual system maps of policy-dependent multi-level drivers of adolescent obesity across five European countries and South Africa.
	PROTEIN - Personalized nutrition for healthy living	IA	• Peer Reviewed Publications: 19 • ICT-based system for providing personalised nutrition and supporting consumers in everyday living. The PROTEIN ecosystem consists of an Android mobile application for the user and a web-based dashboard for nutritionists and other experts;

			volatile organic compound sensor for non-invasive breath analysis of food intake effects; a wearable smart belt for intestinal functioning assessment • AI to develop a recommendation engine for the automatic creation of dietary and physical activity plans. • A mobile application that has been published in Google Play (search for 'PROTEIN EU'); direct-to-consumer genetic testing, and blood and gut microbiome analysis. • Gut microbiome and genetic profiles studied to feed algorithms for personalised interventions
	PROMISS- Prevention of malnutrition in senior subjects in the EU	RIA	• Peer Reviewed Publications: 35 • Online individually-tailored application to count daily protein intake, with and without gamification • Protein Screener can be used to quickly screen older adults for a high risk of low protein intake; evidence-based and sustainable dietary strategies and physical activity strategies to improve the protein intake of older persons with a low protein intake; developed protein-(en)rich(ed) food products and successfully tested them in older persons. • Services aimed at improving nutrition among older populations • Role of the oral and gut microbiome in appetite and malnutrition.
	STANCE4HEALTH- Smart technologies for personalised nutrition and consumer engagement	IA	• Peer Reviewed Publications: 33 • Mobile app offering personalised dietary advice based on gut microbiota analysis; wearable electronic devices to then recommend foods or supplements • Energy bars and biscuits production with tannin extracts two food products (cocoa biscuits and breadsticks enriched with tannins); Dietary supplements (Pre-up, Post-up, Health-up, Seneo-forfe) were developed within the project; Comprehensive food composition database over 2600 foods and 800 components (bioactive compounds such as polyphenols have been included) • Repository of diet-derived metabolites; gut microbiota composition; metagenomics, metabolomics; Personalised nutrition programs incorporating microbiome data
	PREVENTOMICS- Empowering consumers to prevent diet-related diseases through omics sciences	IA	• Peer Reviewed Publications: 12 • Web-based platform (mFood) for delivering personalised nutrition plans based on genetic information; ALDI's e-commerce platform: an improved platform that offers personalised nutrition recommendations at shop level; Simple Feast: a software App which provides a personalised plant-based diet through a convenience food delivery subscription • Nutrigenomic and metabolomic-based dietary recommendations; Behavioural change programme: Do-omics sends out personalised Do's, or micro-behaviours; MètaDieta software: to complete food histories and formulate meal plans; a personalised plant-based diet through a convenience food delivery subscription. • Services offering DNA-based dietary planning • Integrates genomics, metabolomics, and other omics data for personalised nutrition; Analysis of 195 candidate biomarkers of food intake; Food

Food safety systems of the future			consumption assessment methodology: a set of biomarkers of food intake allowing the identification of the actual diet of an individual or population.
	SWEET- Sweeteners and sweetness enhancers: Impact on health, obesity, safety and sustainability	RIA	• Peer Reviewed Publications: 18 • Databases and tools for assessing the impact of sweeteners • Research on alternative sweeteners and their health effects; Toxicological assessment has evaluated the safety of individual S&SEs; Three sugar-reduced beverages have been developed for Phase 1 (acute) trials and two S&SE blends have been included in foods (cakes, biscuits chocolates, yoghurt and cereal); S&SE biomarker method to compare self-reported S&SE intake with real-world has been completed. • Regulatory framework for the approval of new S&SEs in foods has been completed. • S&SE biomarker method to compare self-reported S&SE intake has been completed.
	Co-DIET- Combatting diet related noncommunicable disease through enhanced surveillance	RIA	• Peer Reviewed Publications: 3 • Tools for dietary data collection and analysis- method of dietary assessment using passive cameras and machine learning technologies; AI tool that can deliver personalised dietary advice based on a person's genetics, blood profile, gut bacteria and more. • Dynamic interface between diet and NCD risk factor monitoring and policy; mapping policies in place that are aimed at improving diets in six EU countries and creating a tool that can simulate how diet and other risk factors affect the development of diseases at a population level. • Collaborative approaches to dietary guideline development • Biomarkers from blood and urine for dietary assessment, and integrated genetic, metabolomics, and metagenomics data with non-invasive sensors for NCD risk monitoring
	FoodSafety4EU- Multi-stakeholder platform for food safety in Europe (2021-2023)	H2020 CSA	• Extensive stakeholder support for Digital platform released in 2023 with plans to maintain in the future. (Establishment of sustainable digital platform for Food Safety System for risk assessment. Use of Virtual Social Labs) • 17 outputs on Zenodo
	SAFFI- Safe Food for infants in the EU and China	H2020 RIA	• Production and utilisation of Decision Support Systems and tools by end-users. (Development and testing (in-situ) of decision support tools for the identification, control and detection of hazards (chemical and microbiological) in infant food supply chains.) • 68 peer reviewed articles (20 of which on Zenodo) • 6 patents • policy briefs
	DiTECT- Digital TEChnologies as an enabler for a continuous transformation of food safety system	H2020 RIA	• Application of rapid, in situ sensors and monitoring instruments linked to predictive modelling using AI/ML for intelligent food safety management. • Demonstration activities • More than 150 articles 142 listed (4 on Zenodo). Approx. 1/3 are EU, 20 joint, with the majority CN) • Patents
	ALLIANCE- A holistic framework in the quality Labelled food supply chain systems' management towards enhanced data	IA	• Providing secure transparent food supply management systems to improve food integrity. (Piloting within PDO/organic food supply chains, 6 on Zenodo)

Food systems Africa	integrity and veracity interoperability transparency and traceability		
	HOLIFOOD - Holistic approach for tackling food safety risks in a changing global environment	RIA	• Holistic approach for tackling food systems risks in a changing global environment
	FoodSafeR - A joined up approach to the identification, assessment and management of emerging food safety hazards and associated risks	RIA	• A secure digital platform that centralises access to trustworthy information, data, innovative tools, methods, and training for food safety professionals to effectively address emerging risks (1 on Zenodo)
	Watson - A holistic framework with anti-counterfeit and intelligence-based technologies that will assist food chain stakeholders in rapidly identifying and preventing the spread of fraudulent practices	RIA	• Develop a holistic traceability framework that will integrate data-driven services, intelligence-based toolsets and risk estimation approaches, enabling food safety authorities to identify and prevent fraudulent activities
	SafeConsume - Safer food through changed consumer behaviour: effective tools and products, communication strategies, education and a food safety policy reducing health burden from food borne illnesses	H2020 RIA	• 53 scientific publications • 32 outputs on Zenodo • Practical advice for consumers within the kitchen • Strong links with industry
	LEAP-AGRI - A Long-term EU-Africa research and innovation partnership on food and nutrition security and sustainable Agriculture	Horizon Programme Cofund Action	• 27 R&I funded projects • 742 transnational cooperation and mobility actions • 915 dissemination actions (workshops, seminars, promotional material) • 512 publications (included “in preparation”, “submitted” and “accepted/published”), from which 179 published documents in peer-reviewed literature • 173 scientific and innovation products
	FOODLAND - Food and Local, Agricultural and Nutritional Diversity	RIA	• New network of 14 Food Hubs • 49 open prototypes • 23 validated technological innovations • 26 characterised new food products • training materials, protocols and guidelines • 56 practice abstracts • more than 3,000 smallholder innovation adopters • 50 datasets • 91 DOI-handled scientific articles published (22), submitted or prepared (69) • 32 beneficiaries attained formal academic qualifications.
	HealthyFoodAfrica - Improving nutrition in Africa by strengthening the diversity, sustainability, resilience and connectivity of food systems.	RIA	• Improved production systems (aquaponics, vegetable shades, rhizobia) • Innovative food products (plant-based protein pasta, fish sausages, fruity soy pancakes) • New technologies (improved smoking oven, zero energy cooler) • New governance structures along the value chains (cooperatives including both local community and refugee community, associations) • Capacity building (Food safety, business activities, sustainable production etc.)

			• Visions for more sustainable food systems in a range of different African contexts • Policy advice and guidelines
	InnoFoodAfrica- Locally driven co-development of plant-based value chains towards more sustainable African food system with healthier diets and export potential	RIA	• Maximising the impact of the project results was enabled by efficient dissemination. It included ca. 80 presentations in scientific and industrial events, more than 200 target groups trainings, ca. 50 educational videos, workshops and webinars to stakeholders and supervising students on master, doctoral and post doc levels. 17 MSc theses were completed, and 27 scientific articles published. OA documents can be reached on OpenAIRE, Zenodo and participating organisations' repositories. • 12 business models / plans to launch technologies and products to African and export markets • 10 business skills training modules • Digital tool for collecting dietary data (ODK based 24h dietary recall) accessible on Africainnovationplatform.com • 7 dietary recommendations • 15 Practice abstracts on best crop farming practices and on seed production systems • Various nutritious food products • Prototype of bio-based film material for packaging, use in local markets • Prototype of biodegradable composite granule, use in local and export market • Side streams survey tool and database of manufacturers of packaging materials • Open access tool and updated information on potential biomass sources for African biomaterial and bio packaging industry • A database of 175 companies acting in the packaging sector • African Innovation Platform – Shaping the future of Africa through innovation (africainnovationplatform.com) to promote innovative solutions in Africa beyond a single country and a single value chain – maintains the InnoFoodAfrica toolboxes and provides support for SHFs and SMEs in compliance to regulation and market requirements through consultancy
	Bio4Africa- Diversifying revenue in rural Africa through circular, sustainable and replicable bio-based solutions and business models	RIA	• Online technology catalogue with 72 small-scale biobased technologies • database of 27 local feedstocks analysed • 11 small-scale biobased technologies and processes adapted or developed and transferred • 7 technology combinations explored • 12 business models • 5 business plans • 4 policy briefs • 16 scientific publications.
	FOSC- Food System and Climate: Assessing the impact of climate change on food and nutrition security and designing more sustainable and resilient food systems in Europe and beyond.	ERA-NET Cofund	• "Beside the « classical » outputs of ERA net co-funds (researchers' networks, R&I results valorisation through publications and dissemination process, FOSC developed a knowledge Hub which allowed valorisation of clustered R&I projects. Five Valorisation items of clustered projects : - o Manual: ""Including Traditional Ecological Knowledge (TEK) in Agricultural Research: Guidelines and Lessons Learned" from MedAgriFoodResilience and NUTRIGREEN - o Animated video : Solutions to Drought and Salinity Stress in Agriculture from Bio-Belief, C4C, Trustfarm, and SALAD

Data and digital transformation			- o Animated Video from Salad and Trustfarm: Diversifying African Food Systems for Resilience from UrbanFOOSC and SAFOODS - o Climate-Smart Farming Virtual Reality (VR) Game (VARM) - o Perspective paper : Waste Utilisation in Food and Feed Production from AlgaeBrew, BlueCycling, CHIAM, ClimAqua, Olive3P, PHEALING, and TrustFarm • On the top of that 4 training sessions were organised - o Capitalisation of research outputs and outcomes - o Gender equality - o EURAXESS Africa - o Managing freedom in science and science diplomacy"
	FoSTA-Health- Food Systems Transformation in Southern Africa for One Health	RIA	• Maps of select key agricultural supply chains in Tanzania and South Africa • A set of infographics illustrating system interrelationships relating to maize production systems, land use change, and diet transition • A series of trainings on soil health and nutrition, in southern Malawi, for agriculture extension officers • A series of reports on Representative Transformation Pathways for food systems transformation in southern Africa, in terms of market and supply chains, urban food systems, dietary transitions • A report with practical, policy and research recommendations for food standards in the fresh fruit and vegetable supply chains • A report setting out recommendations for local governments (for Lusaka and Pretoria) on food systems transformation and urban planning, including a guide for monitoring and evaluating progress
	FNS-Cloud- Food Nutrition Security Cloud: federating FNS data on diet, health, and consumer behaviour as well as sustainable agriculture and the bioeconomy	RIA	• Catalogue of FNS datasets for researchers • Toolkit for use of the catalogue • Web based tool for developing FNS community
	Data4Food- Pathways towards a fair, inclusive and innovative Data Economy for Sustainable Food Systems	RIA	• Scenario for inclusive and fair development of data spaces • Monitor for data economy agrifood • Policy recommendations for facilitating development of data economy
	DRG4Food- Empowering a fair and responsible European Food Register, fostering citizen sovereignty and creating a data-driven food system	RIA	• Toolbox and Digital Responsibility Playbook • 8 Pilots for digital solutions applying the toolbox • Roadmap for Responsible Digitalisation
	FOODITY- FOod and nutritiOn Data-driven innovation respectful of citizen's Data Sovereignty	IA	• 12 Pilots demonstrating potential of data-driven innovations in health and nutrition engaging citizens in their development • Set of services and training programmeto be used as building blocks for the pilots • Datalake: platform dedicated to sharing a wide range of food and nutrition data — from nutritional information to recipes and the latest food trends, It gives businesses and individuals access to comprehensive and accurate data that drives innovation and growth

	S3Food- Smart Sensor System for Food Safety, Quality Control and Resource Efficiency in the Food Processing Industry	IA	• Voucher system resulting in portfolio of 58 funded projects focussing on Food Processing
--	---	----	--

Appendix 2 Analytic summary of existing and proposed priorities

Priority and description ⁵⁷	Reflections for consideration
1. Nutrition for sustainable, affordable and healthy diets Key issues under this priority include tackling all forms of malnutrition, including obesity; improving nutrition and diets for all and for specific population groups (children, elderly people, the most vulnerable groups, etc.); developing alternative proteins to foster plant-rich diets; incorporating microbiome-based foods to unlock the power of the human microbiome to improve digestion, nutrient absorption and overall health; exploring how behavioural changes can influence food consumption and dietary habits, improving food authenticity and food safety; encouraging diet diversity by, for example, reviving the use of forgotten crops to improve nutrition and resilience; and supporting healthy diets that are environmentally sustainable. In addition to supporting the new farm-to-fork strategy, this priority also aims to contribute to further development and implementation of EU food regulations and food safety policies, the Steering Group on Health Promotion, Disease Prevention and Management of Non-Communicable Diseases and the relevant targets of SDGs 2, 3, 8 and 10.	• This co-benefit is directional and the goal explicit. • This priority captures the social pillar of sustainability. • It is recommended that 'safe' be included in the title to address food safety aims. • Further, to address concerns around equity and accessibility, 'for all' could be included. • This priority overlaps with Pathway 7 (Nutrition). However, this is not evaluated as a major problem given that nutrition and affordable healthy diets are both an end goal and a driver of change. • This pathway encompasses many other pathways, including Pathway 4, 6 and 8. • To align with systems approaches and to broaden the relevance of the priority, it could be useful to highlight Healthy Diets rather than nutrition when referring to the priority. • The term sustainable diet includes healthy, environmentally-friendly, culturally-accepted and affordable. Including it here is to taken into account the ecological footprint, but this is not the only dimension of sustainable diets. <u>Proposals to rename include</u> Longer name: • Sustainable, safe, affordable and healthy diets for all Short Label: • Healthy / Healthy diets

⁵⁷ European Commission: Directorate-General for Research and Innovation (2023), 24–25.

Priority and description ⁵⁷	Reflections for consideration
2. Climate-smart and environmentally sustainable food systems Key to this priority is that natural resources – water, soil, land and sea – are managed responsibly within the Earth’s capacity to ensure that they are available to future generations. It is meant to foster R&I in support of climate-smart food systems that are adaptive to climate change, preserve natural resources and ecosystem functions, limit environmental degradation and contribute to climate change mitigation. In addition to supporting the new farm-to-fork and biodiversity strategies, this priority also aims to contribute solutions relevant to the common agricultural policy, the common fisheries policy, the EU strategy on adaptation to climate change, EU environmental policies, the Paris Agreement (Conference of the Parties 21) and the relevant targets of SDGs 2, 7, 14 and 15.	• This priority is directional and the goal explicit. • This priority captures the environmental pillar of sustainability. • It is recommended to remove ‘climate-smart’ as it is too narrow, contentious* and absent from broader EU policies.** For example, climate-smart is not referenced in the Vision for Agriculture and Food. • It is also recognised that the climate is a critical challenge: climate change is significantly drive by food systems and deeply impacts food systems. Thus, it would be strategic to maintain reference to climate in the priorities, but also in the wider narrative (Recommendation 1). • Maintaining environment in the title helps to clarify the ecological focus of this priority. However, environmental sustainability can be critiqued for being too broad, vague and lacking a concrete direction. • Alternatives could include concepts such as nature-based, ecosystems, biodiversity circular. • Given the broad public understanding and acceptance of the concept environmental sustainability, the evaluation concludes that it remains a relevant title. * Peter Newell and Olivia Taylor, “Contested Landscapes: The Global Political Economy of Climate-Smart Agriculture,” <i>The Journal of Peasant Studies</i> 45, no. 1 (January 2, 2018): 108–29, https://doi.org/10.1080/03066150.2017.1324426; Rusha Begna Wakweya, “Challenges and Prospects of Adopting Climate-Smart Agricultural Practices and Technologies: Implications for Food Security,” <i>Journal of Agriculture and Food Research</i> 14 (December 1, 2023): 100698, https://doi.org/10.1016/j.jafr.2023.100698. ** Blanca Casares Guillén, “Barriers and Drivers across EU Policies to Achieve Climate-Smart Agriculture,” Policy Brief (Brussels: aeidl, 2024), https://www.aeidl.eu/wp-content/uploads/2024/11/AEIDL_Policy-Brief_Climate-Smart-Agriculture.pdf <u>Proposals to rename include</u> Longer name: • Environmentally sustainability food systems for people and planet

Priority and description ⁵⁷	Reflections for consideration
	• Environmentally sustainable food systems for the climate • Environmentally sustainable and circular food systems for all • Environmentally sustainable and circular food systems for the climate • Biodiverse and circular food systems for people and planet • Biodiverse and circular food systems for people and nature Short Label: • Environmentally-sustainable • Environmentally-friendly • Environment • Nature • Nature-based • Biodiverse
3. Circular and resource-efficient food systems The third priority aims to achieve circularity and resource efficiency in food systems. Circularity implies sustainable, resource-efficient food systems that can address the 1.3 billion tonnes of food lost and wasted per year at the global level. Challenges in this area include striving towards zero food loss and waste throughout the food systems; more efficient recycling of food loss and waste; rethinking food packaging for better biodegradable options that limit harmful substances such as microplastics; and responding to increasing demand for more tailored and local food, and short food supply chains. Also included here are ways to reduce the use of water and energy across food systems so as to increase resource efficiency across all food system sectors. In addition to supporting the new farm-to-fork strategy, this priority is of relevance to the common agricultural policy and common fisheries policy, the bioeconomy strategy, the EU circular economy package (including the waste directive and climate action policies) and the relevant targets of SDGs 2, 8 and 12.	• This priority reflects an approach that can lead to climate-smart, and environmentally sustainable food systems (priority 2). • Circularity and resource-efficiency can be goals, but they are also approaches that led to the goal of sustainability. • Circularity and resource efficiency could be taken up in the pathways, though it is already reflected explicitly in Pathway 5 and implicitly in other pathways. • This priority could fall under Priority 2. If removed, circular should be mentioned in priority. <u>Proposal to consolidate under priority 2.</u>

Priority and description ⁵⁷	Reflections for consideration
4. Food systems innovation and empowerment of communities This fourth priority focuses on developing a healthy place-based innovation ecosystem that supports new business models and/or the delivery of solutions for the social good and/or with market potential that benefits society. The priority will help to create resilient and empowered communities at the local and regional levels, to create new jobs across the EU and to foster thriving urban, rural and coastal economies. Key to this is to stimulate co-creation processes uniting public authorities, the private sector, researchers and society. Challenges to be addressed by R&I here include fostering governance innovation at all levels (local to global), underpinned by a strong SPI; empowering local authorities as agents of change and empowering citizens through social innovation; tackling food poverty and achieving sustainable and accessible food in cities, towns and regions; fostering citizen science, food system education and skills building; developing a true cost-sharing economy for food production and consumption; and implementing data-driven solutions. In addition to supporting the new farm-to-fork strategy, this priority also aims to contribute to the European Commission's digital single market strategy, the EU urban agenda and the Europe for citizens programme, among other policy priorities, and relevant targets of SDGs 2, 9, 11 and 16.	• The priority includes a focus on business models which is critical. • This priority also includes co-creation with stakeholders which is at the core of Food 2030's approach. • Innovation and empowerment can be goals, but they are also approaches that lead to the goal of Food 2030. • It can be problematic to restrict the empowerment of community to innovation, even when social innovation is considered. • Given that innovation is the means through which Food 2030 proposes to advance change, it is not coherent to include it as an end goal. That said, an innovation ecosystem is a relevant outcome and could be addressed in the title of a priority. Given that all Food 2030 programming is linked to innovation, and in the spirit of simplifying, this is not recommended. • Detaching innovation from empowerment could allow for an approach to community empowerment that starts with the needs of communities, with a view towards informing R&I and strengthening the relevance and usability of outputs. • This priority could be removed and be more explicitly written into the narrative and theory of change for Food 2030 (see Recommendation 1), and captured across new priorities (see below). It is critical that a focus on empowered communities be maintained in the narrative of this priority, as well as the overall narrative of Food 2030. • This change could also make more space to address structural inequalities and barriers. • 'Empowered communities' could be its own priority. This could ensure more attention is paid to addressing inequalities and inequities in the food system. <u>Proposal to replace. See below.</u>

In addition, the evaluation puts forward two priorities (or outcomes) for consideration.

Priority	Reflections for consideration
Resilience	Including a focus on resilience would align Food 2030 with policy priorities around climate resilience and securitisation, and bring additional focus to the relations between food systems, food security, climate change and shifting geo-politics (including war and conflict). As outlined in the Vision for Agriculture and Food, the Commission will ‘develop a comprehensive plan to address these challenges, integrating policy, research and on the ground efforts to create a more self-sufficient and sustainable EU protein system, while at the same time diversifying imports’.⁵⁸ This is crucially about resilience. <u>Proposals to rename include</u> Longer name: • Resilient food systems for a secure Europe • Resilient food systems for all Short Label: Resilient
Justice	Just transitions are gaining increasing scholarly and political attention. This is due to the need to consider social and environmental justice as intertwined components of systemic transitions or transformation.⁵⁹ With attention to empowerment and multi-actor approaches, Food 2030 is well positioned to be pioneering here (see also Recommendation 7). As an alternative to just, fairness could be considered. <u>Proposals to rename include</u> Longer name: Just food systems for all Short Label: Just

⁵⁸ European Commission: Directorate-General for International Cooperation and Development, “A Vision for Agriculture and Food Shaping Together an Attractive Farming and Agri-Food Sector for Future Generations” Document 52025DC0075 (Brussels: European Commission, 2025), 11, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0075>.

⁵⁹ Minna Kaljonen, Teea Kortetmäki, and Theresa Tribaldos, “Introduction to the Special Issue on Just Food System Transition: Tackling Inequalities for Sustainability,” *Environmental Innovation and Societal Transitions* 46 (March 1, 2023): 100688, <https://doi.org/10.1016/j.eist.2022.100688>.

Appendix 3 Analytic summary of existing pathways

Pathway	Framing	Reflections for consideration
1. Governance for food systems change	Pathways for change	• Governance is critical for food system transformation and remains poorly understood. There is thus a strong justification for this pathway. • Governance is a very broad concept that ranges from the governance of SMEs to global governance of the food system. Addressing this complexity is important but should be supported with some indication of scope and scale. • Attention to how to govern for transformations , and how to govern through transformations, is required. • Attention to multilevel governance (i.e. understanding horizontal and vertical relations between governance arrangements) is highly relevant for supporting food system transformations and can be made more explicit. • While distinct from governance, policy (public and private) is a critical component of transformation and could be targeted more explicitly across this pathway. • Attention to participatory governance and power asymmetries need to be more explicitly addressed. • This pathway is highly transversal and should be considered in relation to the other pathways. At the same time, specific focus on governance should be maintained.
2. Urban food systems transformations	Desired change	• Understanding the role of urban food systems is important not only because the majority of citizens live in urban areas, but also because urban areas are important sites of food system innovations. • Urban food systems do not exist in isolation. Attention to rural-urban relations are critical. Similarly the role of the peri-urban needs to be considered. Adopting a concept such as 'city-region food systems' or 'sustainable places can better capture the relational dynamics. • Overlap with Pathway 1 should be addressed.
3. Food from the ocean and freshwater resources	Descriptive (mild direction)	• Food from oceans and freshwater resources is fundamental for food security and often ignored in food systems discussions. As such, including these foods in Food 2030 is highly relevant. • This pathway is the only one that does not follow the post-farm rule. • It includes food production systems that are under fast development and transformation, and offer diverse food options and novel materials.

		- Blue food is a broad concept and could be used to simplify the narrative and connect this research to international undertakings, thereby supporting enhanced coherence and impact. Blue foods are sourced in aquatic environments and are important for the economies, livelihoods, nutritional security and cultures of people across Europe. There is evidence that blue foods can help achieve food system ambitions.⁶⁰ - Given the lack of attention to blue food across food systems, it could be relevant to ensure food from oceans and fresh water are also considered more explicitly in other pathways.
4.	Alternative proteins for dietary shifts	Desired change - Alternative proteins are of increasing interest given the potential to improve food security and reduce the environmental impacts of food and feed production.⁶¹ - Focus remains at the level of production, including lab tests. - This pathway could be consolidated into Pathway 7, with a priority on the health impacts and specificities of proteins as one element of a healthy diet.
5.	Food waste and resource-efficient food systems	Can be read as a description and a goal. - This pathway overlaps with current priority 3. - Proposals to adapt the priorities (section 3.2.2) address this overlap. - There is a redundancy in the title resource efficient food systems are systems that limit food waste. Food waste can therefore be removed from the title, though it should remain present in the description.
6.	The microbiome world	Descriptive - The link to food could be made more explicit in the description, particularly for non-experts. - This pathway captures the imagination and is aligned with scientific and societal interest in, for example, gut health.
7.	Nutrition and sustainable healthy diets	Can be read as a description and a goal. - Nutrition is a transversal topic that can translate beyond the pathway. It is also an important outcome. - Nutrition and sustainable, healthy diets are both means to transforming food systems and the desired end. - This pathway overlaps with the title of co-benefit 1. - Pathways 3 and 4 could be included under this pathway. Blue food and alternative proteins would need to be clearly identified under this pathway.

⁶⁰ Beatrice I. Crona et al., “Four Ways Blue Foods Can Help Achieve Food System Ambitions across Nations,” *Nature* 616, no. 7955 (April 2023): 104–12, <https://doi.org/10.1038/s41586-023-05737-x>.

⁶¹ European Parliament. Directorate General for Parliamentary Research Services., “Alternative Protein Sources for Food and Feed.” (LU: Publications Office, 2024), <https://data.europa.eu/doi/10.2861/999488>.

		There is a risk that the pathway could become too broad.
8. Food safety systems of the future	Directional (also descriptive)	- The evaluation positions it as a critical entry point. - The attention to systems and futures is relevant, particularly in the context of the climate crisis. However, to align with other pathways, the pathway could be called Food safety systems.
9. Food systems Africa	Descriptive	- This is a descriptive pathway with specific targets to advance the SDGs. - The focus on Africa could be expanded. For example, Pathway 8 has cooperation with China and there is no specific Asia pathway. - Expanding beyond Africa would align with wider Horizon Europe goals of expanding international cooperation.
10. Data and digital transformation	Desired change, but could also be read as part descriptive, part desired change.	- Data and digitization is a transversal topic across the pathways. Similar to Pathway 1, It could be positioned as both a driver and a pathway. - This should be supported by functioning structures to ensure that knowledge and outcomes (i.e. apps, datasets) are taken up to progress the pathways. - For coherence, it would be important to clarify if Food 2030 talks about transformations in the singular or plural form. Pathway 2 speaks of transformations (plural) and this pathway speaks of transformation (singular). - There are a lack of mechanisms or incentives for wider uptake, especially across diverse sectors of the food value chain. - Focus on AI and blockchain technologies is increasingly relevant and could feature more prominently. - Metadata are extremely important to consider too. The harmonisation of metadata and the sharing of comprehensive and reliable information is also crucial for enhancing the value and re-use of data. - Maintaining a focus on the risks associated with big data, digitalisation and other technologies is fundamental. Data and technologies are not neutral.
11. Zero-pollution food systems	Goal	- This pathway was not evaluated. - There is assumed overlap with Pathway 5 and Pathway 8.

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union.

You can contact this service:

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

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

EU open data

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

The European Commission has appointed independent experts to evaluate the impact of Food 2030, assess its structure and underlying rationale, and provide detailed recommendations on the design and format for a future initiative that builds upon and improves the current model. This work provides the European Commission with critical expert insights to support the evaluation of Food 2030 and guide the conception of its next phase. Following the Food 2030 Pathways for action structure, ten experts have identified potential gaps and synergies to be addressed by EU research and innovation policy on food systems, while considering how the initiative could be reinforced and align with the new political priorities of the European Commission.

Studies and reports

