



EUROPEAN  
COMMISSION

Brussels, 8.9.2026  
COM(2026) 453 final

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN  
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL  
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**New Strategic Approach to Research and Innovation for competitive, resilient and  
sustainable agriculture, forestry, rural areas and food systems**

**Future-proofing EU agri-food through AgRI 2040 and Food 2040**

{SWD(2026) 271 final}

## 1. THE NEW CONTEXT FOR THE EU RESEARCH AND INNOVATION IN AGRICULTURE, FORESTRY, RURAL AREAS AND FOOD SYSTEMS

The **agri-food sector**<sup>1</sup>, comprising agriculture, forestry, activities in rural areas and the broader food systems, is a **strategic asset for the European Union (EU) and its food security, sustainability and competitiveness**. It ensures a continuous supply of sufficient, affordable, safe, healthy and high-quality food for 450 million Europeans. In addition, it plays a key role in mitigating and adapting to climate change threats, while supporting the sustainable management of natural resources, a circular and sustainable bioeconomy and global food security.

In 2023, EU agriculture and food systems generated more than EUR 1 trillion in added value and employed around 30 million people (15% of all jobs in the EU<sup>2</sup>). This includes 4.8 million people employed in 309 000 businesses in the food and drink industry, the EU's largest manufacturing sector<sup>3</sup> that delivered EUR 1.5 trillion in turnover and EUR 296 billion in value added. As the world's largest agri-food exporter, the EU recorded a EUR 50 billion agri-food trade surplus in 2025<sup>4</sup>.

**Rural areas**, home to 25% of the EU population and covering more than 75% of its territory, are key drivers of sustainable growth and innovation<sup>5</sup>. **Forests and other wooded land** cover nearly 44% of the EU's territory and are essential for Europeans' health, biodiversity, rural livelihoods, cultural heritage, economic prosperity, climate change mitigation and adaptation, and the prevention of future environmental and health crises.

To maintain its global leadership, the sector must innovate and modernise more quickly. Despite higher spending on research and development (R&D) over time<sup>6</sup>, Europe's scientific excellence in the agri-food sector, for instance on digital and artificial intelligence (AI) applications, is facing challenges. If the status quo is maintained and the current innovation and deployment gap persist, future agricultural total factor productivity growth is expected to remain modest.

This suggests that research and innovation (R&I) outputs are not sufficiently translated into proportionate productivity gains<sup>7</sup>, sustainability and resource efficiency. In addition, despite remaining relatively competitive in selected agri-food tech segments, Europe's investment gap is

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<sup>1</sup> For the purpose of this Communication, the agri-food sector is understood in a broad sense, encompassing agriculture, forestry, food systems and rural areas.

<sup>2</sup> Eurostat, *Key figures on the European food chain – 2025 edition*, 12 December 2025, <https://ec.europa.eu/eurostat/web/products-key-figures/w/ks-01-25-049>.

<sup>3</sup> FoodDrinkEurope, *Data & Trends: EU Food and Drink Industry – 2026 Edition*, 2026, <https://www.fooddrinkeurope.eu/wp-content/uploads/2026/02/FoodDrinkEurope-Data-Trends-2026-report-digital.pdf>.

<sup>4</sup> *Monitoring EU agri-food trade: Developments in 2025*, European Commission, 2026. The agri-food trade data only cover goods, and exclude fisheries, aquaculture and forestry.

<sup>5</sup> *COM/2025/75 final*.

<sup>6</sup> OECD, *Agricultural Policy Monitoring and Evaluation 2024*, 2024, Paris, [https://www.oecd.org/en/publications/agricultural-policy-monitoring-and-evaluation-2024\\_74da57ed-en.html](https://www.oecd.org/en/publications/agricultural-policy-monitoring-and-evaluation-2024_74da57ed-en.html).

<sup>7</sup> European Commission: Directorate-General for Agriculture and Rural Development, *EU Agricultural Outlook 2025–2035*, Publications Office of the European Union, Luxembourg, 2025, <https://data.europa.eu/doi/10.2762/4491268>.

becoming increasingly pronounced. Agri-food tech investment in Europe fell by 67% from 2020 to 2024, compared with levels 50–70% that were higher in the United States and Canada<sup>8</sup>. To reduce its dependences on other major global powers, in particular when it comes to technologies used in food production, the EU must further strengthen its strategic autonomy by developing AI capabilities for agriculture and food systems.

**The EU agri-food sector operates in an increasingly complex and rapidly changing environment.** The geopolitical context is marked by volatile input and commodity prices, and significant dependencies on third countries not only for technologies but also for farming inputs, in particular fertilisers, energy and protein feed. These challenges are compounded by an ageing and shrinking workforce with gender imbalances, and pressures on land use and natural resources, and are aggravated by the effects of climate change, pollution and biodiversity losses. Structural transformations are underway, from new technology driven farming and food production methods to the emergence of innovative value chains and new circular business models in the bioeconomy sector and use of AI and biotechnology.

Sustainable competitiveness driven by R&I is at the core of both the [Vision for agriculture and food](#) and the [strategy for European life sciences](#). The vision calls for **an update of the 2016 strategic approach to R&I in agriculture, forestry and rural areas** to better target investments, align future priorities with scientific developments and seize new opportunities. The life sciences strategy seeks to position the EU as a global hub for innovation across health, biotech, food and biomanufacturing by 2030, including attracting talents through the [Choose Europe Initiative](#). The strategy also announced the **development of a complementary new strategic R&I agenda on food systems**, building on the current [Food 2030 framework](#). This agenda will support the development of competitive, sustainable and resilient food systems. [Letta](#) and [Draghi](#) reports highlighted the need to strengthen the EU's single market and enhance its competitiveness, being also relevant for the agri-food sector.

Boosting competitiveness requires the adoption of a **full value chain perspective** that strengthens the innovation journey of EU startups and scaleups from research to market. The strategic approach will be structured around **two closely interlinked frameworks** set out in this Communication, aiming to address the EU agri-food R&I ecosystem in a systemic and cross-cutting manner. These frameworks are **AgRI 2040**, focusing on agriculture, forestry and rural areas, and **Food 2040**, focusing on food systems, including fisheries and aquaculture. This Communication draws on insights from the [public consultations supporting AgRI 2040](#) and [Food 2040](#) as summarized in the Staff Working Document<sup>9</sup>. Common thematic issues across both frameworks will be addressed jointly. More specific areas of actions will be identified under AgRI 2040 and Food 2040 focusing

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<sup>8</sup> AgFunder, *Global Agrifoodtech Investment Report 2025*, AgFunder, San Francisco, CA, 2025, <https://agfunder.com/research/agfunder-global-agrifoodtech-investment-report-2025/>.

<sup>9</sup> Commission Staff Working Document: Analytical overview of the achievements of the 2016 strategic approach to agricultural R&I and Food 2030 R&I framework and insights from stakeholder consultation activities, accompanying this strategic approach.

on high-level policy orientations without prejudging the implementation of the next multiannual financial frameworks (MFF).

## **2. SHAPING A THRIVING AND INTERCONNECTED EU RESEARCH AND INNOVATION ECOSYSTEM**

### **2.1. Closing the gap ‘from lab to fab’**

**A strong innovation-based ecosystem is essential to the competitiveness, resilience and sustainability of the agri-food sector.** It relies on open, fair, and collaborative interconnectedness across the different segments of the value chain, and from farmers to consumers.

Europe generates high-quality scientific knowledge in agriculture and food systems. However, its competitiveness is hindered by insufficient private investment in R&I<sup>10</sup> and the **slow development of early-stage research results into commercial opportunities**. The predominance of SMEs, limited investment capacity, and a high labour intensity are additional constraints on commercialisation specific to agriculture, forestry and food systems<sup>11</sup>.

**Innovative SMEs and startups<sup>12</sup> in the agri-food sector** are well placed to develop, adapt and scale up solutions across different contexts. At the same time, their **participation in Horizon Europe** projects and the valorisation of project results remain limited<sup>13</sup>. Fragmented funding<sup>10</sup>, regulatory complexity and insufficient support at higher technology readiness levels (TRLs) **remain key barriers to turning research results into market-ready products and services also in the agri-food sector.**

**This section proposes actions to strengthen the R&I ecosystem**, from early-stage innovation to market deployment, by leveraging research results and supporting market uptake and the growth of startups in the EU agri-food sector, in line with the [EU startup and scaleup strategy](#). It draws on insights from the public consultation supporting AgRI 2040 and Food 2040, as well as feedback from stakeholders and Member States, including contributions from the [Task Force on Startup and Scaleup of the Standing Committee for Agriculture and Research \(SCAR\)](#).

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<sup>10</sup> European Commission, & Heitor, M. (Ed.), *Align, act, accelerate: Research, technology and innovation to boost European competitiveness*, Publications Office of the European Union, Luxembourg, 2024, <https://data.europa.eu/doi/10.2777/9106236>.

<sup>11</sup> European Commission: European Innovation Council and SMEs Executive Agency, Technopolis Group, IDEA Consult, *Monitoring industrial ecosystems – Agri-food – Analytical report – 2024 edition*, Publications Office of the European Union, 2025, <https://data.europa.eu/doi/10.2826/4766674>.

<sup>12</sup> Although start-ups and scale-ups often qualify as SMEs within the meaning of the EU SME definition, they are treated as distinct categories in this Communication for analytical and policy purposes.

<sup>13</sup> Commission Staff Working Document: Analytical overview of the achievements of the 2016 strategic approach to agricultural R&I and Food 2030 R&I framework and insights from stakeholder consultation activities, accompanying this strategic approach.

### ***Fostering investments and valorisation of R&I results in the agri-food sector***

The Commission seeks to make **EU-funded R&I projects more business-oriented** by introducing appropriate elements into calls for proposals, increasing the involvement of private sector and market experts in the evaluation of proposals, and incentivising the valorisation and exploitation of R&I results. Without prejudging the ongoing MFF negotiations and the implementation of future EU funding programmes, the Commission will explore **ways to lower entry barriers and increase SME and startup participation in Horizon Europe projects**. These mechanisms could include the greater use, visibility and accessibility of cascade funding<sup>14</sup> and other simplified administrative procedures, and stronger support to build consortia.

The Commission will **manage the portfolio of R&I funded projects** in the agri-food sector so that it takes into account more explicitly a higher level of technological development<sup>15</sup>, combining assessments of innovation maturity with targeted support tailored to each stage of development.

It will explore the **development of scale-up pathways**<sup>16</sup> **that link different sources of funding** to support seamless investment journeys in the agri-food sector. These endeavours will strengthen the proposed close links between Horizon Europe and the future European Competitiveness Fund (ECF), while ensuring the possibility to use ECF InvestEU Instrument as a delivery tool. The objective is to accelerate commercialisation and strengthen agri-food innovation across the EU.

The Commission will also seek **stronger synergies with organisations and platforms that can support deployment**, including [EIT \(the European Institute of Innovation and Technology\) Food](#), [the European Innovation Council \(EIC\)](#), [the Enterprise European Network](#) and its successor, the EU4Business Network, under the ECF, or European Technology Platforms (e.g. [ETP Food for Life](#)) to name a few.

The EIC plays a central role in supporting breakthrough innovation. Additional ways to strengthen links between **collaborative research projects** and **EIC instruments** will be promoted. The Commission will also explore a **renewed fast-track-to-innovation scheme**, featuring smaller consortia, shorter time-to-grant periods, higher TRLs and stronger participation of startups and other SMEs, farmers, foresters and industry.

A mechanism will also be created for the **early identification of promising R&I results with commercial potential**. The selected results could receive light-touch, rapid and flexible top up funding to bridge the gap between research and early-stage market validation.

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<sup>14</sup> EU Funding and Tenders Portal, [Financial Support for Third Parties \(FSTP\)](#).

<sup>15</sup> Technology maturity is usually assessed using the Technology Readiness Levels (TRL) scale, which indicates how far a technology has progressed from early research to deployment. TRLs are defined in accordance with the [Horizon Europe Programme Guide](#) (European Commission, 2025).

<sup>16</sup> A structured, document-based framework mapping and linking available funding instruments and support measures across stages (TRLs), guiding innovations from research to market deployment and scale-up, and helping SMEs and startups identify and access relevant financing opportunities.

In order to support innovation actors such as researchers, innovators, entrepreneurs, start-ups and other SMEs, the Commission will explore complementary actions, such as **innovation vouchers**<sup>17</sup>, to strengthen their collaboration with European, national and regional **incubators, accelerators, Living Labs**<sup>18</sup>, and **pilot plants**. These actions would provide tailored, demand-driven support for training, business model development, customer research, intellectual property, targeted funding opportunities, and access to testers and corporate partners.

For **intellectual property** (IP), the Commission will explore more **tailored support** for projects with significant market potential at critical stages, building on existing resources such as the European IP Helpdesk, Horizon IP Scan, and the Horizon Results Booster.

### ***Supporting experimentation, regulatory learning and innovation deployment in the agri-food sector***

Rapid experimentation cycles can significantly accelerate the transition from ideas to deployable and commercially viable solutions. The Commission will further explore funding opportunities to facilitate **access to testing and experimentation infrastructures** such as Living Labs and innovation hubs, as well as **public procurement schemes in support of innovation**. This would enable startups and other SMEs to quickly validate prototypes under real-world conditions.

Additional R&I investments are needed to underpin methodologies for **risk assessment**, in addition to a greater use of **experimentation tools such as regulatory sandboxes**<sup>19</sup> and **closer collaboration with EU risk assessment bodies** (e.g. the European Food Safety Authority). The aim hereof is to harvest regulatory learnings to support any necessary adjustments (including data requirements and/or alternative regulatory requirements, among others) to support pre-market approvals and authorisations for agri-food innovations including plant protection products, feed and food (including those derived from genetically modified organisms). The Commission will seek regular input from relevant EU risk assessment bodies and, where relevant, their national counterparts, on R&I needs related to the risk assessment of agri-food innovations.

Long term collaborative and interconnected R&I ecosystems have demonstrated their added value including through EU Missions such as the Mission ‘A Soil Deal for Europe’, institutionalised partnerships as Joint Undertakings, and co-funded partnerships. In line with the ongoing assessment<sup>20</sup>, the Commission will explore how **partnerships can be further leveraged to**

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<sup>17</sup> Innovation vouchers are small, flexible grants for innovation actors to access external business creation and acceleration support services, helping transform promising ideas into viable, market-ready businesses.

<sup>18</sup> Living Labs are user-centered place-based and transdisciplinary research and innovation ecosystems, involving relevant partners in systemic research and codesign, testing, monitoring and evaluation of solutions in real life settings. LLs have been established under initiatives like the [Mission Soil](#), the [Partnership on Agroecology](#), and other Horizon Europe-funded actions.

<sup>19</sup> In [COM/2025/1022 final](#) the Commission has put forward in the context of its proposal for European Biotech Act a set of targeted amendments to the General Food Law Regulation setting out the conditions under which regulatory sandboxes can be set up in the context of the food chain.

<sup>20</sup> European Commission: Directorate-General for Research and Innovation, “Public consultation on Joint Undertakings, Art. 185 initiatives, and thematic priorities for European Partnerships under Horizon Europe 28-34”,



**attract additional private and public investment in priority areas.** The SCAR could play a stronger role as a knowledge broker for assessing EU R&I capacities (strengths and weaknesses) in different agri-food sectors.

By launching a ‘**Science for Policy Centre on Agriculture, Forestry, Rural Development and Food System Innovation and Transformation**’, managed by the Joint Research Centre (JRC), the Commission will support EU and Member States agri-food innovation policies and the sector’s stakeholders (from producers to entrepreneurs) by identifying key innovation opportunities in the agri-food sector; analysing economic impacts and market and deployment gaps; and providing stakeholders with evidence based and actionable knowledge to support strategic decision-making, with the goal to strengthen EU innovation capacities.

Member States are encouraged to consider how they can use their future **national and regional partnership plans** to further reinforce and enhance a supportive innovation ecosystem in the agri-food sector, for example by investing in capacity-building, human resources and innovation-enabling infrastructures such as testing facilities.

## **2.2 Accelerating knowledge and innovation uptake by farmers, foresters and rural actors**

The uptake of innovation is essential for EU food security and for the **competitiveness, sustainability and resilience** of agriculture, forestry and rural areas.

To deliver on the vision for agriculture and food’s objectives, innovation must move beyond individual projects, spread across regions and become embedded in everyday practices. This requires progress across three dimensions: (i) *scaling out*, by expanding proven solutions to more users and locations, (ii) *scaling up*, by shaping policies and regulations to support innovation uptake, and (iii) *scaling deep*, by channelling new practices, values and beliefs in society.

Instruments under the **common agricultural policy** (CAP) can stimulate demand for innovative solutions by supporting farmers in adopting new technologies, sustainable practices and digital tools, and in deploying innovation thanks to investment support. EU agricultural R&I policy, working in close complementarity with the current CAP, has established **strong foundations for the co-creation and dissemination of knowledge and innovation**. However, stakeholders continue to highlight the need for targeted improvements to accelerate uptake of the R&I results<sup>21</sup>.

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10 July 2026, [https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/public-consultation-joint-undertakings-art-185-initiatives-and-thematic-priorities-european-2026-07-10\\_en](https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/public-consultation-joint-undertakings-art-185-initiatives-and-thematic-priorities-european-2026-07-10_en).

<sup>21</sup> European Commission: Directorate-General for Agriculture and Rural Development, *Future-proofing EU agri-food through research and innovation – Summary of results of the open consultation*, Publications Office of the European Union, Luxembourg, 2026, <https://data.europa.eu/doi/10.2762/2404939>.

### ***Supporting farmer-led innovation through the multi-actor approach and Living Labs***

Farmers are more likely to adopt **innovations that have been co-created** with them, tested under real-life conditions and supported by advisory services and peer-to-peer exchanges<sup>22</sup>. Over the last decade, the **multi-actor approach**<sup>23</sup> has become a core feature of agricultural, forestry and rural R&I projects funded under **Horizon 2020 and Horizon Europe** becoming mandatory in more than **70% of relevant calls for proposals**<sup>24</sup>. Living Labs have similarly fostered long-term, transdisciplinary collaboration through place-based experimentation that integrates technical, social and behavioural dimensions.

However, **challenges remain**, including inconsistent implementation across projects, barriers to the early and meaningful involvement of relevant actors, and uneven adoption of results.

The Commission is conducting a study to assess the impact of existing instruments on the dissemination and uptake of innovation. Drawing on its results, the Commission will seek to **harmonise the terminology and methodologies** for the multi-actor approach and Living Labs and strengthen **evaluation and monitoring** mechanisms at project level. The Commission envisages to explore, under the Horizon Europe (2028-2034) and the future ECF, ways to support the early and meaningful involvement of relevant actors through **pre-proposal support** measures that facilitate consortium-building, as well as through **simplified financial support** to ensure fair recognition and remuneration for farmers' and other stakeholders' participation in projects. The link with social sciences and humanities should be strengthened to support **inclusive co-creation processes**. The **participation** of farmers' organisations, cooperatives, advisory and extension services, and agricultural chambers in R&I projects will continue being encouraged. The Commission will also explore **collaborative platforms**, to better connect farmers and other practitioners to projects taking a multi-actor approach.

To support bottom-up innovation, the Commission will promote initiatives that validate **traditional knowledge and practitioner-led solutions**, while engaging farmers in testing innovations across different regions. These efforts should generate **practical guidance** to support wider adoption of innovations. Projects should also systematically assess the **economic, environmental and social costs and benefits** of adopting proposed innovations, while identifying viable business opportunities to better meet users' or market needs. Finally, the Commission will map existing **infrastructures for testing and demonstration** including EU and national Living Labs, demonstration farms and Lighthouses. By helping farmers and practitioners identify relevant

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<sup>22</sup> European Commission: Directorate-General for Agriculture and Rural Development – Unit A.3, *Study on outcomes achieved by EIP-AGRI Operational Group projects under the CAP*, EU CAP Network, 2024, [https://eu-cap-network.ec.europa.eu/publications/study-outcomes-achieved-eip-agri-operational-group-projects-under-cap\\_en](https://eu-cap-network.ec.europa.eu/publications/study-outcomes-achieved-eip-agri-operational-group-projects-under-cap_en).

<sup>23</sup> The multi-actor approach is a form of interactive, transdisciplinary and responsible R&I that aims to make the R&I process more co-creative and inclusive by actively involving relevant actors throughout the research project to make outcomes more co-owned, reliable, demand-driven and relevant to society.

<sup>24</sup> Commission Staff Working Document: Analytical overview of the achievements of the 2016 strategic approach to agricultural R&I and Food 2030 R&I framework and insights from stakeholder consultation activities, accompanying this strategic approach.



locations and resources, this approach will improve their accessibility to relevant infrastructures and strengthen peer-to-peer learning.

### ***Strengthening synergies: building a sustainable and interconnected innovation ecosystem***

The Commission will further strengthen the **links between present and future Horizon Europe and CAP**, by promoting systematic interactions between national contact points (NCP) and CAP networks, notably through a greater use of events organised by the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI). Continued support will be provided to encourage the **participation of EIP AGRI Operational Groups in R&I projects** and to facilitate the dissemination of their results through the EU Thematic Knowledge Hubs as reference points for users and reduce the burden on agricultural advisors<sup>25</sup>.

**Synergies between Living Labs and Operational Groups** will be strengthened to support the local adaptation of innovative solutions. This will include encouraging Living Labs to involve Operational Group partners and, in cooperation with Member States, promoting the uptake and adaptation by Operational Groups of results developed in Living Labs<sup>26</sup>. Connections between Living Labs and the upcoming EU Thematic Knowledge Hubs should also be strengthened to help scale locally tested innovations across the EU. Collaboration **with testing and experimentation facilities**<sup>27</sup> should be encouraged to accelerate the uptake of digital innovations in agriculture, forestry and rural areas.

### ***Maximising the impact and reach of practical knowledge***

The Commission will continue to strengthen knowledge repositories and interoperable, user-centred infrastructures to ensure the **long-term accessibility and usability** of more granular, context specific and practically explained R&I results.

The EIP-AGRI **practice abstracts**<sup>28</sup> format will be revised for **greater accessibility, clarity and relevance**. Projects will be encouraged to allocate resources to turn R&I outcomes into practitioner-oriented handbooks, which should be peer-reviewed to ensure quality and user relevance. They will also be encouraged to make greater use of **digital tools and AI** to support a broader and smarter dissemination of practical findings.

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<sup>25</sup> EU Thematic Knowledge Hubs, as promoted and defined in Horizon Europe Cluster 6 – Work Programme 2026-2027 ([C/2025/8493 final](#)), will be projects designed to act as central sources of thematic knowledge. They should facilitate access to thematic research findings, innovative solutions, and best practices, empowering advisors with cutting-edge knowledge and providing ample opportunities of collaboration and cross-fertilization amongst the different AKIS actors.

<sup>26</sup> European Commission: Directorate-General for Agriculture and Rural Development, *Non-paper ‘Exploring potential synergies between Horizon Europe projects using Living Labs and Lighthouses applied to agriculture, the Common Agricultural Policy EIP-AGRI Operational Group projects and other similar initiatives: the Mission Soil example’*, 2026, <https://mission-soil-platform.ec.europa.eu/resource-library/non-paper-lls-and-ogs-synergies>.

<sup>27</sup> [Sectorial AI Testing and Experimentation Facilities under the Digital Europe Programme](#) such as the [agrifoodTEF](#).

<sup>28</sup> Practice abstracts are short, practitioner-oriented summaries designed to pass on practical knowledge from Multi-Actor Approach projects and EIP AGRI Operational Groups to users.

**Training materials** developed through Horizon Europe thematic and advisory networks should be integrated into training programmes by national Agricultural Knowledge and Innovation Systems (AKIS) to support **high-quality farm advisory services**. Stronger links between advisors and universities will also be essential to ensure that field-level advice reflects the latest research and innovation.

Embedding research outcomes in **vocational education and training and higher education** will be critical for mainstreaming sustainable practices<sup>29</sup> and equipping the future workforce with the skills needed to drive innovation, particularly in the context of challenges posed by generational renewal. Building on the activities of the [European Skills Intelligence Observatory](#), the [Large-Scale Partnership for the agri-food ecosystem](#), [Centres of Vocational Excellence](#) funded by Erasmus+ and [EIT KICs](#) will help identify and address emerging skills gaps.

Finally, achieving widespread innovation uptake will require R&I to **engage beyond the traditional actors** (farmers, advisors and other rural actors), by involving entrepreneurs, regional authorities, educators, civil society and industry more systemically, while strengthening support for citizen science.

## **2.3 Boosting food technology for food-chain resilience and food security**

The food industry's diverse ecosystem, which spans innovative startups and other SMEs, and multinationals, requires significant lab-to-market collaboration to accelerate impactful solutions for new products and services.

While the EU is strong in financing early-stage innovation, upscaling new, sustainable food ingredients requires more financial support to help innovative startups and other SMEs overcome the second valley of death<sup>30</sup>. This is particularly true for the food industry, which has significant capital expenditure requirements and where private investors are often hesitant to support infrastructure financing<sup>31</sup>. Financial support notably implies addressing the continent-wide shortage of industrial-scale contract manufacturing capacity at TRL 8-9 for fermentation-based technologies<sup>32</sup> for food and feed ingredients while fully respecting the EU risk assessment and authorisation framework. Quantum computing, with its significant computational power, combined with digital and AI tools can contribute to improved downstream processing, the development of new food ingredients and the more efficient development of personalised nutrition. The Commission will explore how to increase investment including through the ECF InvestEU Instrument, to accelerate commercialisation and strengthen food innovation in the EU.

Moreover, the EU needs to speed up the adoption of advanced food technologies from early-stage research, scaling up activities to the commercialisation through industrial deployment, while

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<sup>29</sup> OECD, *Policies for the Future of Farming and Food in the European Union*, OECD Agriculture and Food Policy Reviews, OECD Publishing, Paris, 2023 <https://doi.org/10.1787/32810cf6-en>.

<sup>30</sup> The second valley of death occurs from pilot/demo to market scale.

<sup>31</sup> European Investment Bank, *Feeding future generations – How finance can boost innovation in agri-food*, Publications Office of the European Union, Luxembourg, 2019, <https://data.europa.eu/doi/10.2867/008109>.

<sup>32</sup> These technologies include biorefineries and advanced fermentation using yeasts, algae, bacteria and other microorganisms.

continuing to ensure food safety. Achieving this will require committed engagement from key infrastructures and research organisations, including the [Industrial Biotechnology Innovation and Synthetic Biology Accelerator \(IBISBA\)](#), universities, research institutes, biomanufacturing facilities, technology transfer offices and innovation hubs, supported by tools such as the [EU biotech and biomanufacturing hub](#).

Strengthening food supply and security will increase the EU's independence by supporting domestic supply chains for essential food ingredients such as vitamins, amino acids and enzymes, thereby reducing external dependencies. The Commission, together with Member States, could also improve this resilience through digital and AI tools and solutions. [The Important Projects of Common European Interest \(IPCEI\)](#) is another example for pooling Member State investments in strategic food and bio-based value chains.

These can contribute to the transformation of food systems, with applications to reduce food loss and waste, improve the EU's surveillance of food safety and traceability including fighting food fraud, reduce production costs, predict and manage climate-induced risks and human disease risk factors, and boost consumer confidence in the integrity of the EU's food systems.

The Commission has identified advanced fermentation as a lead technology in the EU bioeconomy strategy and will explore how to encourage private investment in the **building and upgrading of open-access pilot and demo-scale bioprocessing infrastructure for advanced fermentation to support the food industry, including SMEs**, to test and de-risk their processes without the need for prohibitive up-front capital expenditure. Member States will be encouraged to do the same.

Health and food are closely interconnected, with nutrition, in line with national dietary recommendations, playing a fundamental role in maintaining good health and health promotion<sup>33</sup>. This area has attracted both emerging and advanced technologies with products contributing positively to consumers health by, for example, addressing the inadequate consumption of some vitamins and minerals in line with national nutrition policies. The Commission will consider how to **reinforce R&I on the link between health and food** to address the increasing number of diseases linked to cardiometabolic and neurological systems, and to include, among others, personalised nutrition.

### **3. R&I NEEDS FOR A COMPETITIVE, SUSTAINABLE AND RESILIENT EU AGRI-FOOD SECTOR**

#### **3.1. Cross-cutting priorities**

The complex and interconnected nature of the agri-food sector call for broad R&I interventions that can deliver impact.

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<sup>33</sup> Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on an EU cardiovascular health plan: the Safe Hearts Plan, [COM/2025/1024 final](#).

While specific thematic R&I areas of action are defined in sections 3.3 and 3.4 as regards the agri-food sector, a systemic approach should be applied across all R&I policy areas and informed by a set of cross-cutting priorities.

**Six initial priorities**, presented below, will guide the implementation of AgRI 2040 and Food 2040 and the deployment of R&I actions that can be supported by, among others, the future Horizon Europe and the ECF, without prejudging the methods of implementing future funding programmes, nor the preparation of work programmes for the period of the next MFF 2028-2034.

- **Competitiveness, startups and scaleups**

The Commission will aim to **strengthen long-term competitiveness** by fostering an R&I ecosystem that enables researchers, innovators and entrepreneurs, together with farmers, foresters, rural actors and industries, startups, scaleups, other SMEs and other businesses to develop new approaches, products and technologies and address the challenges facing their sectors.

- **Food security, resilience and preparedness**

Increasing resilience and preparedness will be a central objective of future actions under this strategic approach, in line with the [European preparedness union strategy](#) and its emphasis on early warning and an integrated all-hazards approach. This priority seeks to increase anticipation and preparedness by recognising how climate impacts, supply-chain disruptions, structural lock-ins and other risks can interact and reinforce one another, and by developing solutions to improve access to raw materials for agriculture, food production and supply, and the bioeconomy.

Resilience requires a holistic approach encompassing food security and sovereignty, open strategic autonomy, ensuring the sustainable management of natural resources, mitigating risks, reducing dependencies, diversification and supply chain continuity, with preparedness capacities strengthened at local, regional and national levels. This includes fostering EU production and supply of proteins, vitamins and other essential nutrients, as well as considering relevant aspects of the recently adopted [Action Plan for resilience, strategic autonomy and sustainability of the EU protein system](#). R&I plays a key role in supporting this transition through the development of tools and capabilities for monitoring, early warning, stress-testing and foresight.

- **Natural resources and circularity**

R&I will support the sustainable management of natural resources. It will contribute to strengthen climate change mitigation and adaptation, including through the development and large-scale deployment of climate-smart solutions for the agri-food sector that also preserve or restore biodiversity and ecosystem functions, while reducing environmental degradation and pollution.

A central element of this priority is to continue supporting the transition towards a sustainable, circular and resource-efficient (including regarding renewable energy) agri-food sector. This involves moving away from linear production and consumption models towards circular systems in which biological resources are used sustainably, more efficiently and waste streams are

minimised and valorised. It also includes efforts to prevent food loss and waste across all stages of the value chain, from production and processing to distribution and consumption.

This priority is aligned with the objectives of the [EU bioeconomy strategy](#), the [Nature Restoration Regulation](#) and the upcoming Circular Economy Act, promoting the circular, regenerative and sustainable use of biological resources to support green growth, and reduce dependence on fossil-based resources, through the sustainable sourcing and use of biomass.

- **Food and feed safety, nutrition and health**

The Commission will contribute to ensuring that food and feed safety, food chain integrity<sup>34</sup> and nutritional quality are addressed in an integrated manner. By deploying R&I across different areas including agriculture, food, nutrition and health, new knowledge and innovations, such as those that are microbiome-based, can help improve safety, nutrition and health.

It will support a level playing field for compliant operators while addressing critical challenges such as food fraud, human malnutrition, biodiversity loss and resource depletion. Where relevant, actions under this priority will be guided by the [One Health approach](#) and the objectives of the life sciences strategy.

- **Fairness**

The Commission will promote R&I that contributes to fair, resilient and inclusive agri-food value chains by ensuring that innovation creates opportunities and benefits for farmers, foresters, rural communities, businesses and consumers. R&I should support fair value creation, distribution of risks, costs and benefits, improve the attractiveness of careers in the agri-food sector for newcomers, and contribute to quality jobs and good working and living conditions, ensuring that the benefits of the transition are shared across regions, generations and all actors in the value chains.

- **Global cooperation for sustainable agriculture, forestry, rural areas and food systems**

This priority addresses the international dimension of R&I in the agri-food sector, in line with EU policy priorities including the EU global gateway strategy and the EU bioeconomy strategy, and seeks to promote shared interests and strengthen collaboration with international partners on common R&I priorities.

The new roadmap agreed between the African Union and the EU on '[Food and Nutrition Security and Sustainable Agriculture](#)' (FNSSA), together with the related International Research Consortium should provide a framework for identifying, with the African Union and related partners, common areas on which to focus. Cooperation with other partners to address similar challenges in agriculture, forestry and rural areas, such as India or the Community of Latin American and Caribbean States, could be further explored.

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<sup>34</sup> Food chain integrity refers to: authenticity, traceability, transparency and the prevention and detection of food fraud. It supports a level playing field for compliant operators while enhancing consumer trust and resilient food supply chain.

Cooperation with Eastern Neighbourhood countries can play an important role in developing a shared R&I agenda with the EU and addressing common challenges, such as the [BIOEAST initiative](#) along with Ukraine, Moldova and the Western Balkans. Further collaboration should also be pursued with the Mediterranean Neighbourhood countries to support and complement the [PRIMA initiative](#). Collaboration should also be strengthened with international organisations such as the UN Food and Agriculture Organization (FAO), the World Health Organisation, the World Organisation for Animal Health, the Consultative Group on International Agricultural Research (CGIAR) and the OECD to enhance the importance and global impact of research and innovation in the agri-food sector.

### 3.2 Common enablers

**Governance, technologies and communities** are key enablers for the implementation of this strategic approach to maximise the impact of R&I activities, strengthen the EU innovation ecosystem and accelerate the deployment of research results.

- **Governance**

Governance is a critical precondition for coherent and effective policy making. It enables coordination across different sectors, disciplines, stakeholder groups and levels of decision-making.

The effective governance of R&I in the agri-food sector helps ensure that the EU invests in impactful research, technology and innovation. It also supports the integration of diverse forms of knowledge and different perspectives and business models, encourages inclusive stakeholder engagement, promotes youth participation and gender equality, and strengthens skills development and training.

Strong governance also supports transdisciplinary research, greater integration of natural sciences and the social sciences and humanities, and stronger links between R&I and policymaking, including in relation to the blue economy<sup>35</sup>. Some examples are the EU Mission ‘A Soil Deal for Europe’ and the Bioeconomy Mutual Learning Exercise. The One Health approach can contribute to the development of competitive, sustainable and resilient agriculture and food systems. For example, the One Health approach can address the challenge of antimicrobial resistance<sup>36</sup> by considering interlinkages between humans, animals and the environment. Furthermore, One Health microbiome-based solutions can create opportunities for new products for health, food, sustainable agriculture and forestry or aquaculture.

R&I can further support governance by generating evidence, testing and comparing approaches, strengthening monitoring capacities, and helping public authorities and stakeholders understand what works in different territorial and sectoral contexts. One way of achieving this is through foresight exercises, developed with Member States and stakeholders, that explore credible future

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<sup>35</sup> Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a new approach for a sustainable blue economy in the EU Transforming the EU's Blue Economy for a Sustainable Future, [COM/2021/240 final](#).

<sup>36</sup> Council Recommendation on stepping up EU actions to combat antimicrobial resistance in a One Health approach 2023/C 220/01, [ST/9581/2023/INIT](#).



scenarios and identify where R&I can provide timely new knowledge and innovation to address emerging challenges.

- **Technologies**

Technologies are a cross-cutting driver of innovation, and a key enabler of this strategic approach. R&I plays a central role in developing emerging technologies, supporting the uptake of existing solutions and addressing related social and ethical considerations.

**Technologies, including digital ones such as AI, are important tools to transform agriculture, forestry, rural areas, the food industry and food environments, and to enable sustainable patterns of food consumption.** They are also rapidly reshaping the way research is carried out. At the same time, data has become a strategic asset that drives digital transformation, creates competitive advantages and enables innovative solutions.

Biotechnologies are another important cross-sectoral enabler for the agri-food sector that can help it realise its full potential<sup>37</sup>, as reflected in the recently proposed [first European Biotech Act](#), which is to be followed by a second Biotech Act.

The Commission will identify emerging trends and the digital, data-driven and biotechnological innovations that are available. These efforts will strengthen connections across the agri-food ecosystem and be developed in full complementarity with current and upcoming initiatives, including the proposed Observatory on Emerging Technologies<sup>38</sup>, existing European partnerships<sup>39</sup>, Common European Data Spaces, [European Digital Infrastructure Consortia \(EDICs\)](#) and European Digital Innovation Hubs (EDIHs), as well as actions under the EU bioeconomy strategy and under the life sciences strategy.

- **Territories and communities**

The uptake of innovation in agricultural and food systems depends on the involvement of farmers, actors in the food chain, consumers and local communities, and on solutions that are adapted to local and regional realities. Territories, including regions, act as living innovation environments where technological and social innovations and new methods of governance can be tested, adapted and embedded.

Place-based approaches are a powerful tool for delivering local responses to global challenges. They can strengthen urban-rural links and contribute to both sustainability and resilience<sup>40</sup>,

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<sup>37</sup> European Commission: Joint Research Centre, *Emerging biotechnologies in Europe – Foresight for policy*, Publications Office of the European Union, Luxembourg, 2024, <https://data.europa.eu/doi/10.2760/4814109>.

<sup>38</sup> The proposed Regulation for the European Competitiveness Fund ([COM/2025/555 final](#), Art. 14) states that the Observatory should “inform the ECF Strategic Stakeholder Board”, by identifying investment opportunities across different technology areas.

<sup>39</sup> Notably, the [Horizon Europe Partnership of Agriculture of Data](#).

<sup>40</sup> European Commission: Directorate-General for Research and Innovation, *Urban food system transformation in the context of Food 2030 – Current practice & outlook towards 2030*, Publications Office of the European Union, 2023, <https://data.europa.eu/doi/10.2777/507125>.

enabling agrifood transformation by connecting local resources, knowledge, people and innovation.

**Resilience can be strengthened by balancing long and short supply chains**, increasing diversity, and developing robust and sustainable local and regional food systems. This can contribute to strategic autonomy while reducing local food insecurity.

The **involvement of local actors in innovation processes** is crucial for the acceptance, uptake and long-term integration of innovations in local ecosystems (for example through **Living Labs**, the **LEADER** programme, **smart villages**, the **I3 Instrument** and the **startup villages initiative**).

Territorially grounded and community-driven innovation will be pursued through this common enabler. It will support solutions that build on local assets and opportunities, including for agri-food industries and where the multi-actor approach can play a role in the **empowerment of communities**.

Considering the role of territories and communities in R&I will help **strengthen regional competitiveness** and improve the EU's diverse innovation ecosystems. In parallel, the science-policy-society interface for the agri-food sector will be reinforced, with stronger linkages between projects and decision-makers to **maximise the impact of innovative solutions at local level**.

Cooperation between territories, communities and municipalities with shared R&I priorities and complementary capabilities is also a powerful catalyst for innovation, **as demonstrated by partnerships of the Thematic Smart Specialisation Platform on Agri-Food** within the framework of Smart Specialisation Strategies (S3) under cohesion policy, including the European Regional Development Fund and Interregional Innovation Investment instrument.

### 3.3. AgRI 2040

**AgRI 2040** will be an overarching framework for agricultural, forestry and rural research and innovation. It will help **identify thematic and cross-cutting R&I needs through evidence-based analysis and stakeholder co-creation**, and will be regularly updated to reflect the evolving global context.

Without prejudice to the next MFF, AgRI 2040 will provide a strategic direction under which these needs could be addressed through actions funded by relevant work programmes of future funding programmes. Particular attention will be paid to the valorisation of research and innovation results into startups, scaleups and industrial deployment, as well as to their dissemination, uptake and adoption by farmers, foresters and rural communities.

Furthermore, AgRI 2040 will serve as an organising framework to mobilise funding and implementation partners around well-defined segments of the agri-food value chain, while providing a coherent governance structure. Particular attention will be paid to strengthening AKIS through R&I, improving knowledge flows, advisory services, skills development and innovation uptake, while promoting agroecological approaches, including organic farming.

AgRI 2040 **will propose areas of action to implement the priorities of this strategic approach.** The following **eight preliminary areas of action reflect the needs already identified** through the vision for agriculture and food, the public consultation, SCAR inputs and the staff working document accompanying this Communication. **The Commission will organise the EU AgRI 2040 conference** on 24-25 September 2026 and follow-up activities to further co-create and refine these areas of action with stakeholders.

- **Soil, agri-ecosystems, water and nutrient capital**

This area of action focuses on R&I that contributes to **restoring and maintaining healthy soils and resilient water systems** as the foundation for climate change mitigation and resilience, food security, biodiversity protection and restoration, and sustainable agricultural production.

Priority actions include generating knowledge, technologies and tools to improve soil health, water quality and water availability, while addressing pollution, erosion, water scarcity, desertification, nutrient losses and biodiversity decline. It also includes R&I that develops sustainable land and water management approaches and practices, such as agroecology and organic farming, carbon farming, agroforestry and nature-based solutions.

A further priority should include R&I to **reduce the use of resources and improve use efficiency**, particularly for nutrients and water, while helping to scale-up the circular recovery and management of nutrients, including bio-based fertilisers and soil improvers, and the valorisation of agricultural and food-processing waste streams.

R&I can accelerate the deployment of practical solutions through Living Labs, including digital technologies and integrated systems to monitor soil, water and nutrients. Innovations at the interface between agriculture and aquaculture should be explored. **Particular attention should be paid to the soil-water-energy nexus**, including R&I on controlled-environment agriculture, as well as on multilevel governance, innovative business models, and soil literacy to support long-term change across the value chain.

- **Cropping systems**

This area aims to foster R&I that supports climate-smart, sustainable, resilient and competitive cropping systems. It focuses on strengthening adaptation to environmental stresses such as drought, salinity and extreme temperatures, including through agroecological approaches.

It also seeks to improve **preparedness for and responsiveness to emerging and future threats to plant health**. This includes developing and deploying rapid and effective tools for prevention, early detection, treatment and biological control of plant pests.

R&I actions should promote **sustainable and low-risk crop protection** through integrated approaches that combine agroecological and agronomic practices with biological solutions, low-risk alternatives, breeding, biotechnology, precision technologies, and digital tools.

The potential of **plant breeding, knowledge of seeds and plant varieties, biotechnology and genetic resources** should be further leveraged. This includes supporting breeding activities, as

well as the development or reintroduction of climate-smart, resource-efficient, resilient, resistant and diverse varieties, including neglected and underutilised species, suited to a wide range of conditions, with due consideration of the legal<sup>41</sup> and policy context.

R&I actions should also strengthen **protein crops** as a strategic component of a more resilient and sustainable EU protein system, addressing agronomic performance, processing and nutritional value, and the development of food, feed, and circular value-chains.

- **Livestock systems**

This area aims to foster R&I that supports the sustainability, competitiveness, excellence, territoriality and resilience of livestock systems to **safeguard animal health and welfare, reduce the environmental impact of the livestock sector**, and promote precision farming. It will contribute to the objectives of the [livestock strategy](#).

It should support impact-driven animal breeding for multiple purposes with due consideration of the legal and policy context, and foster the development of sustainable feed and nutrients, including vitamins and amino acids.

R&I can reinforce biosecurity measures by taking a multidisciplinary approach. R&I should support the development of new interventions, treatments and vaccines, as well as improvements to existing solutions that target priority animal diseases, including zoonoses, while safeguarding animal welfare and encouraging the prudent use of antimicrobials.

**Integrated approaches to animal health and welfare**, including the socio-economic dimension, should be further developed through R&I and measures that combine disease prevention, disease control and emergency preparedness while improving animal welfare outcomes.

Resource efficiency should be improved through **innovative feed measures**, such as optimising grass-based and pasture systems, improving feed conversion, and safeguarding biodiversity while reducing land pressure through approaches such as agropastoralism. Resource efficiency should also contribute to mitigate emissions and minimising waste across the value chain by promoting the principles of the circular economy. Structural changes that impact the livestock sector, such as the use of new alternative proteins, climate change or changes in the geopolitical context should be duly considered and comprehensively addressed as part of a systemic approach.

- **Bioeconomy in agriculture, forestry and rural areas**

This area focuses on R&I for the **efficient and sustainable use of agricultural and forestry land and biomass**, and to boost **biomanufacturing** while generating evidence to support sustainable **business models** and **governance tools** that create additional income for primary producers and rural communities. Through R&I, the European production of **bio-based alternatives to synthetic inputs** should be improved, including **bio-based (organic) fertilisers** and **low-carbon**

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<sup>41</sup> Regulation (EU) 2026/1388 of the European Parliament and of the Council of 17 June 2026 on plants obtained by certain new genomic techniques and their products, and amending Regulation (EU) 2017/625, [OJ L 1388, 30.6.2026](#).

**fertilisers**<sup>42</sup>. In line with the cascading principle for the use of biomass, R&I should also enhance the co-production of **renewable energy**. Furthermore, this area should provide opportunities for innovation in **wood-based** products and materials.

This area should also include the development of new business models to **reduce production costs** and **increase the resilience** of biomass producers. R&I should also support technologies and processes for the **local valorisation** of sustainable biomass, by-products and residues, circular processes, recycling and reuse of bio-based products.

- **Multi-functional forests**

This area aims to strengthen the **sustainable management of forests for multiple benefits**, according to the principles of active sustainable forest management as defined by Forest Europe<sup>43</sup>, increase the resilience of forest ecosystems and forest-based sectors, and reward foresters for the ecosystem services they provide in both rural and urban contexts.

Priority actions should include supporting the **restoration and protection** of forest habitats, contributing to climate change mitigation and adaptation, capitalising on the potential of agroforestry and boosting the forest-based bioeconomy.

This area should include R&I to generate scientific evidence for the **identification of adaptive and resilient forest management practices**, analysing the impact of different forest management practices on the sustainability of forest ecosystems, and improving knowledge on forest carbon sinks, including the role of forest soil.

It should also promote the **sustainability and resilience of European forests** in the face of new and emerging pests and diseases, R&I on how to restore damaged forests, and help to reduce wildfire risks. It should explore the use of currently underutilised tree species through adapting processing technologies, technical and digital innovation and new business models. R&I should assess tree species diversity, develop and test methods for the conservation of forest genetic resources and tree propagation.

To strengthen the **forest-based bioeconomy**, a better understanding of the benefits of wood-based products is needed, including the capacity to ensure long-term carbon storage and delivering greater value including from by-products.

This area should strengthen the **role of foresters in the value chain**, develop new business models for foresters, enhance financial incentives for non-provisioning services, and meet societal expectations for forests, including on the well-being of different actors.

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<sup>42</sup> Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, *Fertiliser Action Plan: Partnership for ensuring the availability, affordability and strategic autonomy in home-grown EU fertilisers*, [COM/2026/310 final](#).

<sup>43</sup> Forest Europe, [Sustainable Forest Management, SFM](#).

- **Rural areas**

This area focuses on R&I to **strengthen the competitiveness and attractiveness of rural areas**, thereby supporting generational renewal and improving services and infrastructure to enhance living and working conditions and strengthening the links between farms, forests, territories, and food systems.

Particular attention should be paid to **innovation and entrepreneurship by women and young people in rural areas**, and place-based approaches to innovation at local scale, including through regulatory sandboxes.

R&I should also support **innovation to delivering public services** (including education, healthcare, transport and mobility and digital connectivity), market access and green businesses. It should open up new job opportunities in diverse economic sectors to improve people's quality of life, retain people and talents working in rural communities, and attract new actors.

Further support is needed for education, vocational training and lifelong learning, and to improve people's skills. In addition, robust digital infrastructures should be further supported and improved.

- **Stronger agri-food value chain**

As part of the shared AgRI 2040 and Food 2040 cross cutting priority of fairness, this area aims to address aspects such as the development of new knowledge and **tools to strengthen farmers' position in the agri-food value chain** and address cost pressures and sustainable transitions by collaborating across the agri-food value chain. It should also **promote on-farm and local food processing and commercialisation** and improve the governance of rural food systems while reinforcing urban-rural linkages. Furthermore, it should support **innovations that strengthen opportunities for farmers in short, local and regional supply chains**, encourage new and sustainable business models and increase digitalisation and decarbonisation.

To strengthen farmers' position in the agri-food value chains, R&I should support EU quality schemes, including organic production and geographical indications, as well as the processing and marketing of organic products and other value-chain innovations that improve farmers' economic position.

- **Digitalisation, AI and robotics**

This area of action aims to foster **data valorisation across agri-food supply chains, forestry, and rural services** to enable actors to make effective and efficient use of data, AI and digital solutions. Better access to, and use of, high-quality data can support informed decision making and evidence-based policies and pave the way for digital solutions and advanced AI applications, including generative AI.

Priority should be given to increasing the development, accessibility and uptake of digital solutions for a broad range of users, including small and medium-sized farms and rural businesses. **R&I**



**should support the deployment and use of key technologies** such as software and IT tools, robotics, drones, augmented and virtual reality, and remote and proximal sensing, ensuring they meet operational needs and suit users of all skill levels. The accelerated adoption of AI should be fostered to help reduce administrative burdens, increase performance, improve access to knowledge and support faster and better-informed decisions-making through predictive insights. R&I should also enable new AI-powered robotic applications and more efficient, data-driven operations across farming, forestry and rural services.

The benefits and costs of digital-based and data-based R&I solutions should be demonstrated in a feasible, strengthening trust in their use and the skills, know-how and advisory capacity needed for their effective integration into daily practices should be deployed.

### 3.4. Food 2040

Under Food 2040, the Commission will develop six areas of action to implement the priorities of this strategic approach, to enable the co-creation of R&I activities that meet identified needs, and to facilitate the identification, dissemination and uptake of R&I results in EU food systems, without prejudging the next MFF.

- **Place-based food systems**

This area of action connects with the enabler ‘Territories and Communities’ to deploy future R&I projects in this field. Place-based food systems reflect the diversity and richness of Europe’s food cultures and territories, and can serve as **incubators for innovations** and for social cohesion.

This area of action will foster resilient and inclusive local (including urban) and regional food economies and the cross-border interactions that **address local challenges** (including environmental challenges). It combines technological and social innovation with community engagement to encourage **food system innovations and develop education and skills**.

Place-based food systems include ‘**rural-urban**’ and ‘**city-region**’ interfaces as areas where interlinkages can help with the co-creation of innovations in local food systems through, among other activities, **entrepreneurship initiatives, co-creation spaces, networks of cities and Living Labs**. These are powerful initiatives that can enrich territories. **Regional Innovation Valleys for Bioeconomy and Food Systems**, which can support the implementation of other place-based initiatives, are examples of interregional collaboration in Europe.

- **Healthy and sustainable diets**

Over half of the world’s population struggles to access healthy diets<sup>44</sup>, leading to negative consequences for public health, social equity, and the environment.

This area of action will advance **R&I for healthy, more sustainable and nutritious foods** (in accordance with the cross-cutting priority ‘food and feed safety, nutrition and health’). In addition, it will support the **diversification of protein sources**, while addressing citizens awareness of

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<sup>44</sup> Independent Expert Group (IEG), *2021 Global Nutrition Report: The state of global nutrition*, Development Initiatives, Bristol, UK, 2021, <https://globalnutritionreport.org/reports/2021-global-nutrition-report/>.

biotech-based ingredients, and using AI to enable the safety of food to be predicted. The R&I activities will also consider food safety, food contaminants, macro- and micronutrients, enzymes, reformulation and food-health interactions, which all play a prominent role in supporting healthy and sustainable diets.

This area of action will explore **microbiome** science, the interaction of food and gut microbiome functionality, the microbiome's link to specific human disorders, the identification of specific microbial biomarkers for risk-related diseases and enabling the microbiome to promote health benefits at different stages of the food value chain.

**Cultural, behavioural and social drivers** of diets will be considered to promote equitable and sustainable dietary transitions through education and inclusion, accounting for demographic shifts and the nutritional needs of an ageing population. R&I activities will also address concerns about **food accessibility and affordability** by promoting healthier diets and dietary diversification within planetary boundaries.

- **Resource efficiency and zero-pollution in food systems**

This area of action will foster new knowledge and innovative solutions to **increase resource efficiency, reduce food waste from processing to consumption, and decouple food systems** (including food processing and distribution) **from fossil fuels** (including petrochemical products for packaging and transport). It will cover activities to help the food and drink manufacturers, transport companies, and other operators across the food value chain, in their efforts to **reduce pollution**, while **preserving biodiversity**. It will support the **energy transition** of food systems as a critical lever for achieving climate and energy goals and ensuring the competitiveness and resilience of the food industry. It will also cover **food packaging solutions** that aim to boost sustainability, such as reducing material use, increasing bio-based packaging, and improving recyclability and the shelf life of products.

The area of action will also support research on **microbiome**-based solutions, including the study of their behaviour and functionality in post-harvest environments (e.g. storage, processing and packaging), with the aim of unlocking their potential to reduce pollution, improve food preservation, and enhance overall resource efficiency.

- **Food environments and consumer empowerment**

This area of action will advance **understanding of the environments that shape what people eat**, including the availability, affordability, accessibility, labelling, packaging, transport, distribution, and marketing of food, as well as the role of social media. It will support the development of solutions that improve the availability, affordability and transparency of healthy and sustainable choices. This area of action will be closely linked, therefore, to the 'Healthy and sustainable diets' area of action. It will draw on behavioural, social, and cultural sciences to better understand consumer behaviour and perceptions of food, support demand-side transformation, and strengthen consumer trust and education.

- **Scaling innovations, business models and fair food systems solutions**

This area of action will support a food systems transition that is **innovative, competitive and closer to market**, as well as socially fair and respectful of ecosystems and planetary boundaries. R&I activities should lead more often to commercial applications such as innovative products, new ventures and technologies which require: (i) collaboration between academia, industry and different institutions or infrastructures; (ii) investment; and (iii) the promotion of the right partnerships to succeed. This area of action is defined in cross reference to sections 2.1 and 2.3.

In addition, structural barriers, inequities and vulnerabilities, and environmental degradation from food systems will be addressed in order to **scale promising solutions and to create new business models from pilot stage to market** by providing technical and financial support. Technologies, including AI solutions, digital platforms and the development of biotechnologies for scaling up R&I activities on food systems will be a priority area of intervention in cross reference to the technologies enabler.

- **Aquatic food**

In line with the forthcoming EU ocean and water research and innovation strategy, this area of action will aim to foster **new knowledge and solutions in support of sustainable fisheries and aquaculture in marine and inland waters**, while supporting sustainable food systems and food security, and the transition towards a thriving and regenerative blue bioeconomy.

It will address, among other elements, **climate-related and other natural risks** that affect aquatic food value chains. It will include the development of models to understand and predict the interaction between fisheries and aquaculture and aquatic ecosystems and will support the integration of food production in the most circular and sustainable way.

Innovation in selective and low-impact fishing gear will reduce by-catch and habitat disturbance. **Animal welfare and health issues** will continue to be a priority, with a focus on the full range of farmed and fished aquatic biota, addressing breeding and, where applicable, feeding and the reduction of EU reliance on feed imports. It will **empower fishers and aquaculture farmers** to co-design the management of aquatic living resources in the most societally acceptable way, balancing biological, ecological, economic and social considerations. R&I will support sustainable aquaculture (including organic, offshore and integrated multi-trophic aquaculture), technologies such as advanced fermentation, market uptake of underutilised aquatic biomass (such as byproducts from fisheries and aquaculture, algae, and invasive species) and sustainable and short aquatic food value chains.

#### **4. CONCLUSIONS**

Research and innovation related to the EU's agri-food sector is crucial for Europe's food security and strategic autonomy, and to safeguard and boost the overall EU's competitiveness. Building on the 2016 strategic approach to EU agricultural R&I and the Food 2030 R&I framework on food systems, this new EU strategic approach presents R&I as an opportunity to improve the

competitiveness, sustainability and resilience of the EU agri-food sector, and to secure a good quality of life for people in Europe within planetary boundaries.

This new strategic approach will serve to strengthen the innovation to investment journey, and boost the uptake of new knowledge, innovation and solutions across the agri-food sector. It will also help to ensure that investments are efficiently and effectively targeted, align future priorities with scientific developments, and enable the EU to seize new opportunities through the closely interlinked frameworks of AgRI 2040 and Food 2040.

## Annex 1: Key actions and timeline

### Closing the gap from lab to fab

|   | <b>Actions</b>                                                                                                                                                                                                                            | <b>Starting from</b> |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 1 | Support, through a targeted call for proposals and other actions in the current Horizon Europe, the better valorisation and exploitation of results from collaborative projects and the greater use of AI in agriculture and food systems | 2027                 |
| 2 | Increase the involvement of private sector and market experts in the evaluation of collaborative research proposals submitted to Horizon Europe agri-food sector calls                                                                    | 2027                 |
| 3 | Strengthen support for risk assessment methodologies by harvesting more systematically R&I needs from EU bodies responsible for the pre-market assessment of agri-food innovations                                                        | Q4 2027              |
| 4 | Promote closer collaboration between Horizon Europe's agri-food sector collaborative research and the EIT Food and the European Innovation Council (EIC)                                                                                  | Q4 2026              |
| 5 | Launch a 'Science for Policy Centre on Agriculture, Forestry, Rural Development and Food System Innovation and Transformation', managed by the JRC, to support EU and Member States policymaking and stakeholders' innovation capacities  | Q4 2027              |
| 6 | Prepare a toolbox for EU and national actions to help startups and scale ups in the agri-food sector with the active involvement of the Standing Committee for Agricultural Research.                                                     | Q4 2027              |
| 7 | Encourage Member States to use the future national and regional partnership plans to further enhance a supportive innovation ecosystem in the agri-food sector                                                                            | Q4 2026              |

### Accelerating the uptake of knowledge and innovation by farmers, foresters and rural actors

|    | <b>Actions</b>                                                                                                                                                                                                                   | <b>Starting from</b> |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 8  | Enhance the efficient implementation of the multi-actor approach by harmonising terminologies and strengthening its evaluation and monitoring frameworks                                                                         | Q1 2028              |
| 9  | Establish and manage the use of collaborative platforms to facilitate matchmaking between farmers, practitioners and multi-actor approach projects, boosting the engagement of users in R&I                                      | Q1 2028              |
| 10 | Foster stronger links between Horizon Europe national contact points and national CAP networks through targeted EIP-AGRI events                                                                                                  | 2027                 |
| 11 | Revise the common format of the practice abstracts, that are used to disseminate the practical results of operational groups and Horizon Europe projects, to enhance their clarity, user accessibility and practical orientation | Q4 2027              |
| 12 | Map and promote EU and national testing and demonstration sites to boost farmers' access and the uptake of peer-to-peer innovations.                                                                                             | Q4 2027              |

|    | <b>Actions</b>                                                                                                                                                   | <b>Starting from</b> |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 13 | Valorise the results of the EU study on the impact of specific Horizon Europe tools that support sustainable innovation in agriculture, forestry and rural areas | Q4 2026              |

#### **Boosting food technology for food chain resilience and food security**

|    | <b>Actions</b>                                                                                                                                                                                                                                        | <b>Starting from</b> |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 14 | Encourage private investment to support the building and upgrading of open-access pilot and demo-scale bioprocessing infrastructure to support SMEs to test and de-risk their processes without the need for prohibitive up-front capital expenditure | Q1 2028              |
| 15 | Reinforce the link between health and food to address the increasing number of diseases linked to cardiometabolic and neurological systems, and to include among others personalised nutrition                                                        | Q1 2027              |

#### **AgRI 2040: Identifying potential R&I needs for competitive, sustainable and resilient EU agriculture, forestry and rural areas**

|    | <b>Actions</b>                                                                                                            | <b>Starting from</b> |
|----|---------------------------------------------------------------------------------------------------------------------------|----------------------|
| 16 | Host the first AgRI 2040 conference to identify R&I needs and co-create the preliminary areas of action with stakeholders | Q3 2026              |
| 17 | Develop areas of action under AgRI 2040 with R&I needs identified with stakeholders                                       | Q4 2027              |

#### **Food 2040: Identifying potential R&I needs for competitive, sustainable and resilient food systems**

|    | <b>Actions</b>                                                                                    | <b>Starting from</b> |
|----|---------------------------------------------------------------------------------------------------|----------------------|
| 18 | Develop R&I activities on the six Food 2040 areas for action to achieve the priorities identified | Q3 2028              |
| 19 | Host the first Food 2040 high-level conference to bring the R&I food systems community together   | Q4 2028              |