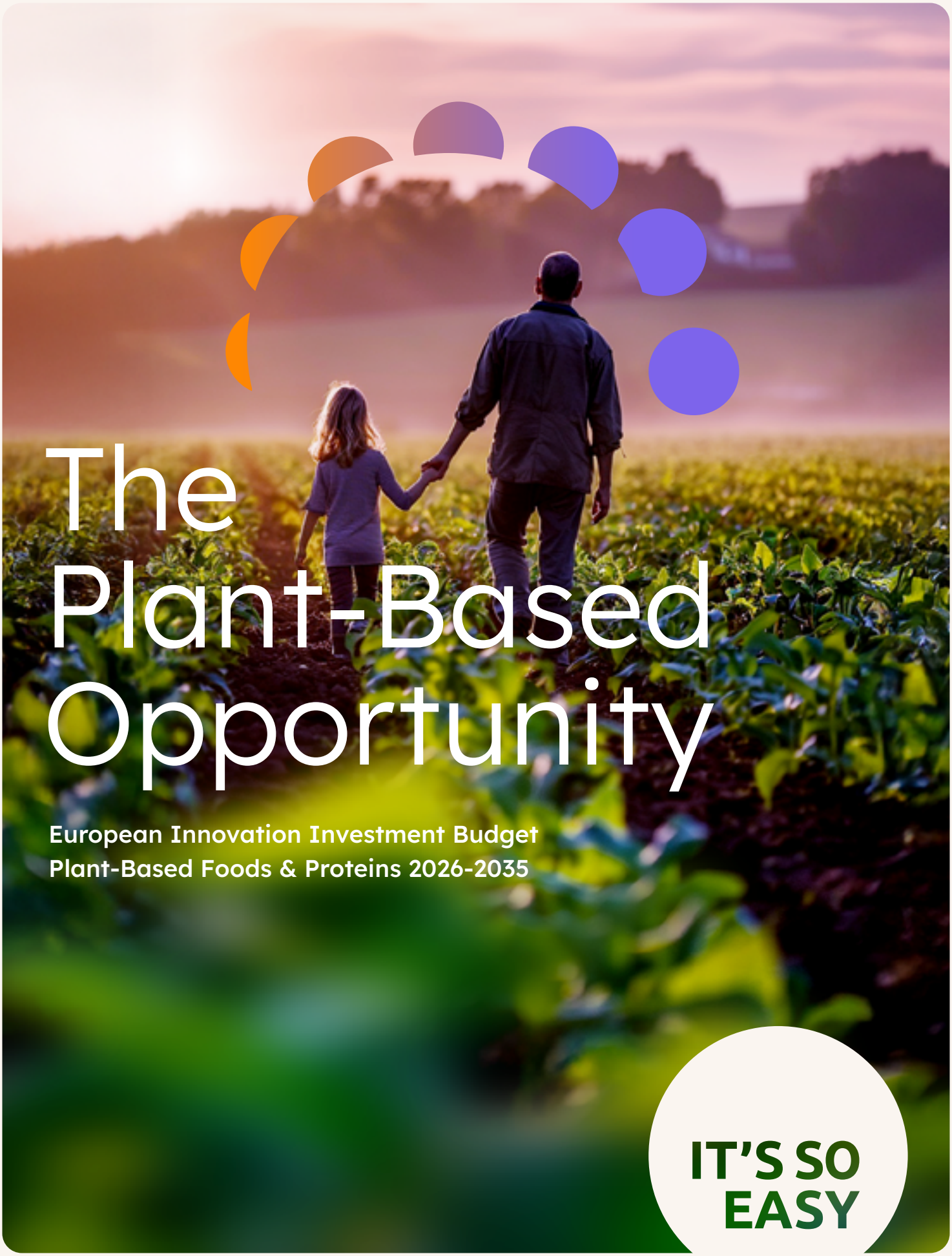


The Plant-Based Opportunity

European Innovation Investment Budget
Plant-Based Foods & Proteins 2026-2035

IT'S SO EASY

Plant-Based Foods Europe

European Alliance eapf for Plant-based Foods

EUVEPRO

FOODCONNEXT FOUNDATION

The Plant-Based Opportunity

Executive Summary

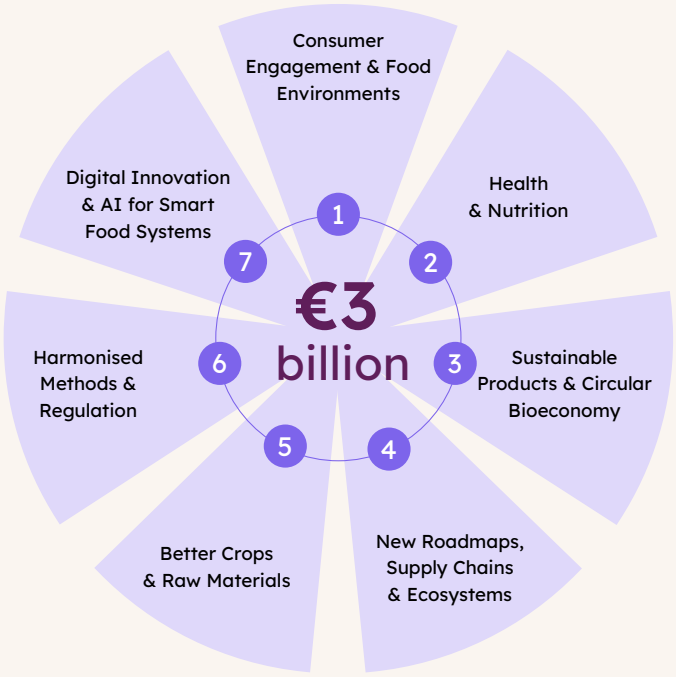
Europe's food system is at a turning point
A shift towards more plant-based foods and proteins is essential to address pressing challenges: public health costs linked to poor diets (€900 billion annually), climate change and biodiversity loss, unsustainable land and resource use, and the need to strengthen the competitiveness of Europe's agri-food sector.

Investing in plant-based food innovation delivers multiple benefits. It enhances food security by diversifying protein sources and reducing reliance on imports. It supports healthier diets by making sustainable options more accessible and attractive to consumers. It generates new markets and value chains for farmers, stimulates growth and jobs across the European food industry, and positions Europe to compete globally as other regions, including the United States and China, rapidly scale up their plant-based sectors.

A European Innovation Investment Agenda

This report presents **the Plant-Based Foods & Proteins Innovation Investment Budget 2026–2035,** developed through consultation with leading companies, researchers, and stakeholders. It outlines **75 concrete innovation projects** requiring **€3 billion over the next decade** – a threefold increase compared to 2020–2024 funding levels.

The investments are structured around seven innovation pillars:



1	Consumer Engagement & Food Environments	€720m
2	Health & Nutrition	€455m
3	Sustainable Products & Circular Bioeconomy	€995m
4	New Roadmaps, Supply Chains & Ecosystems	€360m
5	Better Crops & Raw Materials	€220m
6	Harmonised Methods & Regulation	€195m
7	Digital Innovation & AI for Smart Food Systems	€50m

Together, these pillars form a roadmap to accelerate the protein transition towards more plant-based foods consumption.

Key Outcomes by 2035

By 2035, the impact of this innovation agenda will be visible across Europe's food system. The share of plant-based foods in total protein intake is projected to rise from 40% to 50%, marking a significant shift in consumption. At the same time, a stronger European innovation ecosystem will emerge, with industry, governments, and research institutes co-investing in scalable solutions. These efforts will deliver tangible improvements in the affordability, taste, nutrition, and sustainability of plant-based products, making them more accessible to consumers across all markets. Crucially, new value chains for key European crops such as soy, pea, faba bean, sunflower, and oat will be established, securing farmer incomes, boosting regional development, and strengthening Europe's competitive position globally.

A call to action

To unlock these opportunities, Europe must act decisively. Scaling up investment in plant-based research and innovation to at least €3 billion by 2035 is essential to match the ambition of the sector. At the same time, policies and funding need to be better aligned across the European Commission's departments – from agriculture and research to health, environment, industry, and finance – to ensure coherence and maximise impact. Building strong partnerships between the Commission, Member States, industry, and civil society will be critical, following the successful model of initiatives such as the Circular Biobased Europe partnership. Finally, the transition must actively engage both consumers and farmers, ensuring that healthier and more sustainable diets are accessible to all while delivering fair and rewarding opportunities across the value chain.

This agenda is ambitious but achievable. By acting now, Europe can secure healthier citizens, sustainable food systems, and a globally competitive plant-based sector.

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1 | Introduction

Leading organisations from across science, industry, and civil society agree: a protein transition towards more plant-based foods and less animal-based foods (from a ratio of 40:60 to 60:40) is needed to address urgent challenges related sustainability, public health, climate, land use, nutritional equity, and deliver on important Sustainable Development Goals[1].

Investing in plant-based innovation means stronger food security, healthier citizens, and new opportunities for farmers.

An EU Action Plan for plant-based food and protein innovation, backed by appropriate funding, will ensure that Europe stays competitive globally while responding to the needs and expectations of its citizens.

Support an innovation ecosystem through industry co-investment. Europe's plant-based food industry stands ready to invest in research, product development, and manufacturing scale-up, provided the right policy framework is in place for long-term predictability.

This report showcases seventy-five innovation projects with a total investment budget of €3.0 billion between 2026-2035.

Key Drivers for an Innovation Budget for plant-based foods and proteins

1. (Food) Security and Sovereignty

Investing in plant proteins diversifies sources of protein, reduces reliance on imports, and strengthens supply chains, making the EU less vulnerable to external shocks[2].

2. Improving Health

Diets across the EU are significantly misaligned with healthy eating guidelines: 80% of Europeans are not eating enough wholegrains, legumes, fruits and vegetables (EU Safe Food Advocacy, 2024). This underconsumption is a key driver of cardiovascular diseases, cancer, diabetes and kidney disease (Institute for Health Metrics and Evaluation, 2019). In the EU, diets low in legumes account for the loss of an equivalent of 2 million years of good health (DALYs) and 130,000 avoidable deaths from all causes (European Commission, 2024). The hidden costs of unhealthy diets are estimated at almost €900 billion per year across the EU (Impact Institute, 2023).

1 A Sustainable Development Goals: SDG 2 (Zero Hunger), SDG 3 (Good Health), SGD 12 (Responsible Consumption), and 13 SDG (Climate Action).

2 The EU currently has a deficit in plant protein production and relies on imports for 66% of its high-protein feed, thereby exposing EU producers and consumers to global food price fluctuations and supply chain vulnerabilities while also creating unfair competition **(European Commission, 2024).** A crucial opportunity to contribute to closing the protein gap is to increase plant-protein production for direct human consumption, as this avoids a conversion loss of more than 75% **(Alexander et. al., 2016)**, boosting land-use efficiency, and the EU's self-sufficiency and competitiveness by doing better with less.

Targeted research and public funding will make plant-based foods more delicious, affordable, and convenient, encouraging healthier diets and making sustainable eating accessible to all European consumers[3].
The Eat-Lancet (2025) report is calling for a healthy food accessible to all-produced, processed, distributed, and consumed fairly within planetary boundaries.

The Planetary Health Diet is a global reference diet based on the best available science. It represents a dietary pattern that supports optimal health outcomes and can be applied globally for different populations and different contexts, while also supporting cultural and regional variation.
The PHD is rich in plants: whole grains, fruits, vegetables, nuts, and legumes comprise a large proportion of foods consumed, with only moderate or small amounts of fish, dairy, and meat recommended. The PHD is based entirely on the direct effects of different diets on human health, not on environmental criteria. The diet's name arose from the evidence suggesting that its adoption would reduce the environmental impacts and nutritional deficiencies of most current diets. See also: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(25)01201-2/abstract)

3. Sustainable Agriculture and Innovation

European farmers can benefit from diversifying their production by introducing new crops, particularly if this is accompanied by financial support. Increased production of protein crops for human consumption can provide farmers with higher profit margins, and lower input costs (European Commission, 2020).

4. Competitiveness

Strategic investments will enable Europe to remain a leader as nations like the USA and China scale up plant-based foods & protein sectors, keeping innovation and manufacturing within the EU.

5. Protecting Climate and our Environment

Animal-based proteins require dramatically more land, water, and energy, contribute significantly to greenhouse gas emissions, and are linked to deforestation, overfishing, and biodiversity loss. Leguminous crops, such as peas and beans, enhance soil health by naturally fixing nitrogen, while reducing our reliance on synthetic fertilisers that contribute to environmental harm. Plant-based foods production significantly lowers greenhouse gas emissions.

6. Higher Economic Growth and Jobs

Plant-based foods & proteins represent a significant commercial opportunity, especially during periods of economic recovery, and can stimulate innovation and job creation within the European food sector., enhancing EU competitiveness in global markets (GFI, 2025).

7. Reducing Expenditure European and National Budgets

The opportunity to save on public spending is enormous (Impact Institute, 2023). In 2022, the economic costs of animal-based food production and consumption in the EU, including its impact on animal welfare, human health, climate, land use, water and air pollution, amounted to €3 trillion — over seven times the economic costs of their production and consumption. A scenario with healthier and more plant-based diets could save 43% of these externalities, amounting to €1.3 trillion annually (>20 times the size of the CAP budget) (FAO, 2020).

3 Note that plant-based food production uses no antibiotics, helping mitigate the risk of antibiotic-resistant bacteria and improving public health and strengthen the EU's Health One approach. All EU member states have dietary guidelines that recommend a higher consumption of wholegrains, legumes, fruits and vegetables, and nuts. Some countries, are already developing and implementing food strategies to promote a shift to eating more plant-based foods **(EEB, 2025).** To ensure policy consistency and support from both farmers and consumers, a coherent EU-wide policy can drive alignment with dietary guidelines across all parts of the value chain.

2 | The Innovation Budgets in Europe (2020-2024)

The Good Food Institute Europe carried out an extensive research on the funding of the European plant protein landscape, which was close to €400M **(GFI, 2024).**

Figure 1

Public and non-profit investment in plant-based R&I by research area, including funding for traditional fermentation (January 2020-April 2024) (GFI, 2024)

Investments (€ millions)

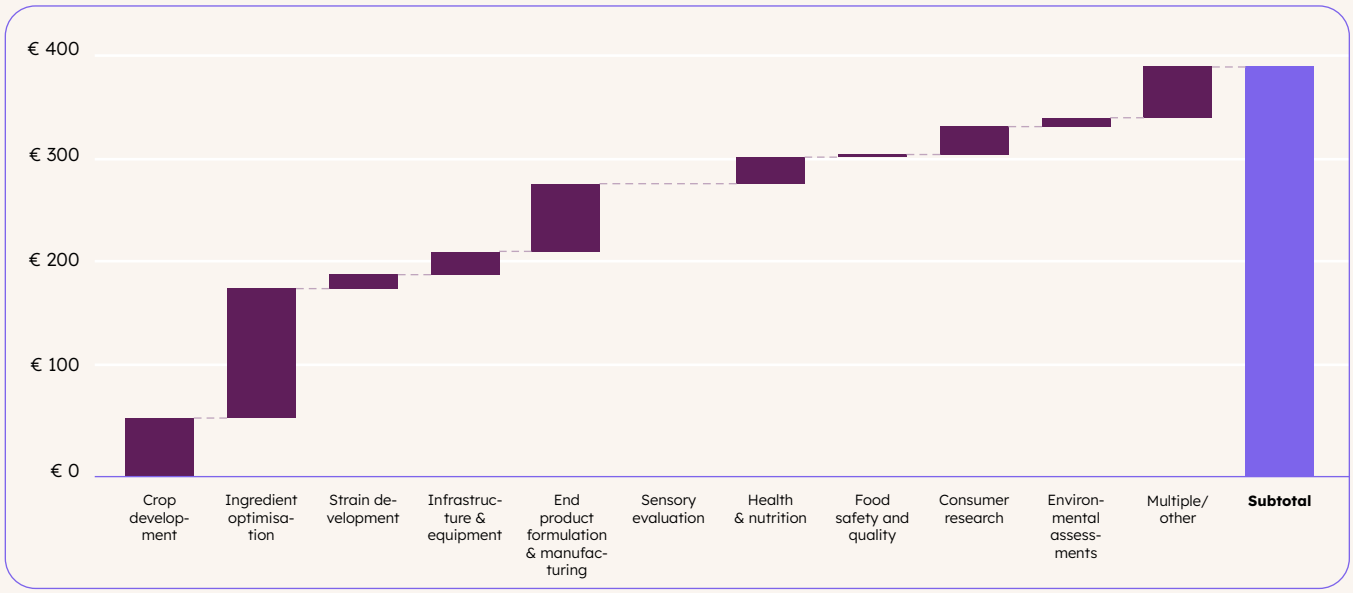
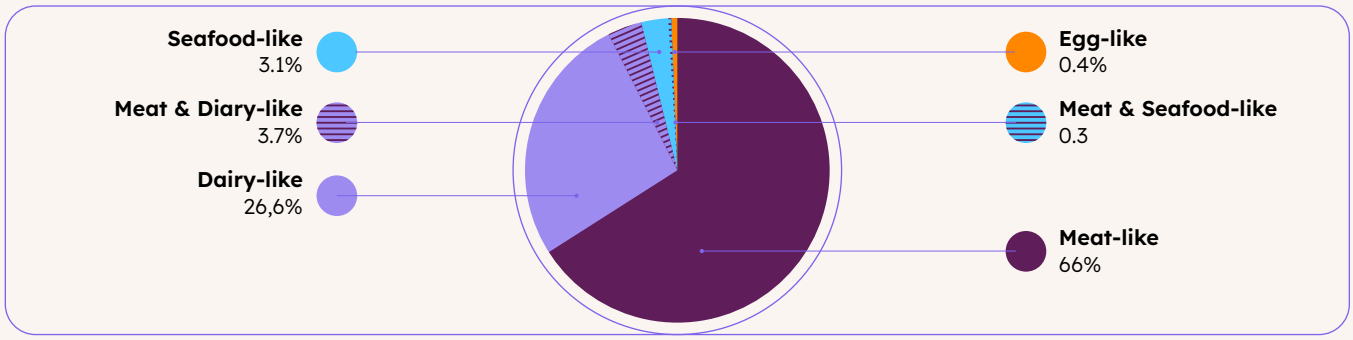


Figure 2

European public and non-profit investments in plant-based R&I by end product focus (GFI, 2024)



3 | The Future Innovation Investment (2026-2035)

The ClimateWorks Foundation estimated that in order to unlock the full climate and economic benefits of plant-based proteins, global public spending on R&I would need to reach an average annual figure of €3.9b in the years 2022-2050 (ClimateWorks, 2019).

To contribute proportionately to this global total, Europe would need to invest an average of €760 million per year through public funding[4].

This Innovation Investment Budget Plant-Based Foods & Proteins calls for a very modest starting investment of €3.0b between 2026-2035.

The report focusses on benefits for Europe in the following pillars of innovation:

1. **Increased Consumers Engagement & Food Environments**
2. **Improved Health & Nutrition**
3. **More Sustainable Products & Circular Bioeconomy**
4. **New Roadmaps, Supply Chains & Ecosystems**
5. **Better Crops, Raw Materials & Crop Diversification**
6. **Harmonisation of Methods & Regulations**
7. **Unique Digital Innovation, AI & Smart Food Systems**

The seven innovation pillars support plant-based foods and proteins from different crops. The collaborative work on this report also yielded a concept note and road map for R&I investments in the oat crop (see Innovation Case 1). The oat roadmap research projects are integrated into the seven innovation pillars. It will be key in the future to develop such commodity specific road maps also for the following key crops in Europe: soy, pea, faba bean, and sunflower.

4 Note: Based on Europe contributing a proportionate share of the global investment, using an estimate of Europe's 2022 global share of R&D of 20.4% (OECD, 2022).

Innovation Case 1
Oat Road Map: Investments to scale a unique crop (2026-2035)

Oat is a nutrient-rich crop with untapped economic, nutritional, and environmental potential to support Europe's transition to a more competitive global bioeconomy, healthier population and resilient food systems. EU-based innovation in oat-based foods and drinks has been a key driver of plant-based category growth, with opportunities for further growth and value creation globally. The oats market is expected to grow at a CAGR of 5.48% from 2025 to 2032, reaching € 8.82 billion.

Despite Europe's leadership in oat production and processing, R&I investment remains fragmented and underfunded, limiting the sector's ability to deliver on EU goals for food security, climate resilience, and public health. With a long-standing cultural and agricultural legacy across the EU, oats provide a solid foundation for innovation-driven growth and positions the region as a global leader in advancing sustainable food systems.

By investing in oat R&I, the EU will be uniquely placed to seize a large proportion of this growth and capitalize on recent advances in oat genomics, AI-enabled process optimization and personalized nutrition tools that could generate the next generation of mainstream healthy plant-based foods.

The four R&I objectives prioritized by a number of stakeholders across the oat value chain are:

Advance Oat Varieties for Sustainable Agriculture

Accelerating breeding of climate-resilient, high-yield oat varieties optimised for nutrition, taste and processing using EU-led genomic tools, while exploring oat's role in regenerative farming and ecosystem services.

Promoting the EU Oat Bioeconomy for Green and Digital Transitions

Developing advanced processing technologies and valorising oat side-streams to create sustainable, culturally tailored oat-based products and packaging, supported by AI-driven innovation and circular economy principles.

Etablish Oat as a Strategic Crop for Human Nutrition & Health

Strengthening the evidence base for oat's health benefits through mechanistic, clinical, and population-level research. Focus areas include bioactive compounds, gut microbiome interactions, and harmonized nutritional assessment methods to support innovation in lifespan-appropriate foods and inform policy.

The heart of the roadmap is a European Oat Data & Innovation Platform

A pan-European platform unifying genomic, agronomic, processing, and nutritional data to drive collaboration, investment, and policy alignment. This Platform will act as a hub for knowledge exchange, capacity-building, and cross-sectoral innovation.

The Oat4EU Road Map is not just a research & innovation initiative - it's a strategic investment in Europe's agricultural competitiveness, food security, public health, climate resilience, and bioeconomic growth. Central to the initiative is a multi-actor approach, engaging stakeholders across academia, industry, farming, civil society, and policy. This inclusive governance model builds on existing expertise and ensures co-creation of knowledge, stakeholder buy-in, and scalable impact. A preliminary network has been established, with plans to expand across Europe to build a cohesive and competitive oat ecosystem.

By investing in the Oat4EU Road Map, the EU can transform an underutilized crop into a cornerstone of its sustainable future. Securing leadership in plant-based innovation, improving citizen health, and building a resilient food system for generations to come.

4 | The Seven Innovation Pillars

4.1 | Increased Consumers Engagement & Food Environments

Innovation Pillar 1

Enhanced consumer engagement and targeted transformation of food environments are pivotal to drive dietary transitions toward more plant-based foods and sustainable protein sources across Europe.

Strengthening consumer research and launching evidence-based public awareness campaigns are essential steps to foster behavioural change and accelerate the transition towards healthy, sustainable, and affordable plant-based diets in alignment with EU policy objectives, including Competitive Compass, Food Security, Strategic Autonomy, and European Cancer Plan.

A pan-European research and innovation agenda should address all nodes of the value chain, focusing on inclusive food systems and enabling environments.

The following three strategic flagship projects demonstrate pathways to scale up consumer engagement effectively:

Project 1: Develop and implement integrated policy frameworks at the national, regional, and municipal levels to reshape food environments, improving the accessibility and affordability of plant-based foods through multi-level, supportive actions and partnerships.

Project 2: Design and evaluate nudging and behavioural intervention strategies - with a focus on positive incentives, and equitable taxes, transparent “true pricing,” and communication of climate and health impacts—to encourage consumers to trial, adopt, and repurchase plant-based foods.

Project 3: Advance innovation in retail and food service settings (including supermarkets, e-commerce platforms, and out-of-home dining), deploying AI-empowered insights to optimise product placement, menu design, and marketing approaches that support the widespread uptake of plant-based foods.

The current report highlights only three projects, underscoring a future need for broader interdisciplinary collaboration. In close consultation with behavioural scientists, food system stakeholders, and marketing experts for robust, inclusive impact, more consumer-centred innovation projects can be developed.
The innovation investment to scale up consumers engagement & food environments between 2026 and 2035 totals €720M.

4.2 | Improved Health & Nutrition

Innovation Pillar 2

The consumption of plant-based foods can contribute big time to the sustainable development goals related to poverty and health. Determining the health effects of the transition towards more plant-based food consumption is key.

The following four strategic projects are proposed, leveraging public-private collaboration and multi-actor engagement. These projects must take a holistic approach, leveraging epidemiological studies, biomarker analysis, nutritional modeling, gut microbiome research, and consumer-centric behavioral studies to assess health impacts comprehensively.

Project 1: Determination of the health effects of moving to plant-based diet (high fibre, vitamins, phytochemicals, low in SFA) on general health via long-term epidemiological studies including prevention of CVD, high cholesterol, T2D, obesity, nutrient deficiencies etc), and the long-term effect of an increased intake of plant-based food diets on the health of specific consumers (elderly, infants and vulnerable), diseases (Cancer, Alzheimer, Parkinson) and people with very strict diet or with eating disorders.

Project 2: Development of knowledge on the effect of protein ingredient technologies (milling, extraction, spray drying, extrusion) and protein purity (flours, concentrates, isolates) on protein ingredient and plant-based food digestibility.

Project 3: Defining for older adults a balanced healthful plant-based diets, considering differential effects on various health parameters (e.g. metabolic, muscle health) and potential differences in bioavailability of foods (processed)

Project 4: Defining for older adults the meal quality of currently consumed/ recommended meals using available meal-based protein quality tools in different settings (home, hospitals)

The innovation investment budget for the health transition towards more plant-based food consumption between 2026-2035 is €375m.

The total innovation investment for an improved health & nutrition (including various smaller projects) between 2026-2035 is €455m.

4.3 | More Sustainable Products & Circular Bioeconomy

Innovation Pillar 3

Plant-based proteins and foods have improved over the last 10 years. However, consumers' uptake of plant-based foods can grow significantly with enhanced taste, texture, and nutritional profile. Moreover, the cost of producing plant-based proteins and foods can be lower when the processes are more sustainable, and less side-streams are produced.

During the past decade a lot of focus has been dedicated to improving the taste and texture of for instance meat-free centre of the plate products and soy beverages.

Lower R&I budgets have, however, been attributed to product like plant-based cheeses. The quality of plant-based food products is related to the stage of market development and growth (see Innovation Case 2). Hence, a call for more R&I budgets for other and newer plant-based products.

Innovation Case 2
Evolution of plant-based foods

Food Category	Market stage	Product examples
Meat-free Centre of the Plate	Mainstream	Meat-free Burgers, balls, mince ...
Meat-Free Snacks	Emerging	Nuggets, Breaded Sticks ...
Meat-Free (Semi)-Dried	Emerging	Meat-free Salami, Cabanossi, Jerky ...
Dairy-Free Milk	Mainstream	Dairy-Free Milk ...
Dairy-Free Yoghurts	Emerging	Dairy-free yogurts (dairy, gelatin) ...
Cheese Analogues	Emerging	Dairy-free mozzarella, hard (gouda) ...
Dairy-Free Ice-cream	Emerging	Various ice cream types ...
Beverages	Growing	Juices ...
Fish-Free	Emerging	Fish-free salmon, tuna, shrimp ...
Egg-free	Emerging	Egg-free eggs, omelet ...
Ready meals	Emerging	Meat-Free lasagna, stir-fry ...
Powdered foods	Emerging	Dairy-free creamers, milk powders ...
Plant-Based Bakery goods	Emerging	Bakery goods with eggs, dairy, gelatin ...
Confectionery	Emerging	Dairy-free meringues (egg-free), chocolate ...
Bars	Emerging	Protein bars ...

Moreover, approximately 50% of animal proteins are used as ingredients in food formulations. Replacing even half of these could deliver significant benefits for sustainability, health, and food costs, especially as animal protein prices will rise.

4.3.1 Better Taste, Texture & Nutrition

More research & innovation investments in product and ingredient quality are, however, needed to scale past investments and make quantum leaps forward in consumer consumption. Annex 2 contains a list of 16 concrete projects to accelerate the industry's growth and make it more cost-effective and sustainable.

The innovation investment budget to improve taste & texture in 2026-2035 is estimated at €375m.

4.3.2 Novel Processing Technologies

Innovations in processing can greatly improve the business cases of protein ingredients and plant-based foods, thus creating more affordable, sustainable and nutritious foods. A list of 13 concrete projects has been developed to accelerate the industry's growth.

The innovation investment budget for novel processing methods in 2026-2035 is estimated at €620m.

4.3.3 Total Innovation Investments in plant-based foods & proteins

The innovation 2026-2035 budget to accelerate "more Sustainable Products & Circular Bioeconomy" pillar is €995m (Table 1).

Table 1

Total Innovation Investments More Sustainable Plant-Based Products and Proteins & Circular Bioeconomy (2026-2035, €m)

Innovation Investment Budget	€ million
Better Taste & Texture	€375m
Novel Processing Technologies	€620m
Total	**€995m**

4.4 | New Roadmaps, Supply Chains & Ecosystems

Innovation Pillar 4

Under Innovation Pillar 4 three flagship projects have been defined:

Project 1: 'Super Highway' Crop Road Maps (€100m)
A comprehensive, long-term roadmap for key protein crops—soy, pea, faba bean, sunflower, and oat—is essential to advance Europe's protein transition. This roadmap should align growers, breeders, processors, the food industry, retailers, and food service actors as well as researchers around a shared vision and strategic objectives to scale sustainable production and accelerate plant-based protein consumption.

Currently, food and plant-based crop markets are small, and pulse crops remain commodity products. Developing a joint value chain growth plan is critical, including shared investment and cost-sharing mechanisms. Aligning agricultural acreage plans, farmer organisations, and the food industry can foster annual crop growing commitments and improve food security across Europe.

This roadmap will also catalyse new ecosystems spanning the farm-to-fork value chain, which will underpin the growth of European and regional value chains.

Project 2: New Ecosystems & Value Chains (€100m)
Building robust multi-stakeholder networks that promote communication and collaboration among breeders, farmers, processors, retailers, and food service operators is key. Targeted awareness and education initiatives should ensure farmers and breeders understand evolving market demands and innovation trends in plant-based foods. Partnerships that foster innovation and adaptability to market changes and sustainability goals must be encouraged.

Transparency and affordability will shape the future of plant-based supply chains. Research should enhance value chain transparency about origin and production methods, steered by corporate sustainability reporting (CSRD) and Environmental, Social, and Governance (ESG) frameworks, which also help quantify carbon tax benefits.

A prime example of such a new ecosystem is the development of an European Tofu & Tempeh Research Centre can accelerate this category. An investment of €25m is part of the total investment of this pillar (see Innovation Case 3).

Innovation Case 3
European Tofu & Tempeh Research Centre

The €400 million market (2025) for specific natural and low processed foods, such as tofu and tempeh is growing fast in Europe, 10% compared to 2024 and a continuous growth will bring the market value to €1.1b by 2035.

A European Research Centre for natural and minimally processed plant-based foods—including tofu, tempeh, and seitan—will bridge a major research and innovation gap within the protein transition. Despite a long tradition and growing market, R&I investment in these products has remained modest, impeding their potential to deliver on sustainability, health, and food system resilience objectives.

This Centre will function as an innovation hub and knowledge platform, anchoring a new ecosystem dedicated to improving yields, nutritional profiles, crop diversification, and rapid functionality testing. It will catalyse scalable R&I trajectories, connecting academic research with pilot-scale production and fostering collaborative public-private partnerships to maximise impact.

Priority areas will include:

- **Developing and validating advanced testing methods for ingredient functionality and product safety.**
- **Supporting the application of novel crops and cultivation techniques, alongside breeding strategies to enhance protein content and sensory quality.**
- **Accelerating laboratory-to-market scaling, with a focus on value chain integration and circular bioeconomy principles.**
- **Enhancing consumer insight and science-driven communication for improved market acceptance and societal impact.**

The Centre will also serve as a nexus for knowledge exchange and capacity-building activities, linking universities, research institutes, industry stakeholders, technology providers, and consumer organisations across Europe. By fostering multi-actor collaboration, it will attract public and private investment, offer incentives for innovation, and support Horizon Europe and FOOD2030 goals, ensuring European leadership in sustainable plant-based food innovation.

Connecting food security and competitiveness strategies through aligned acreage plans and cooperative commitments can facilitate annual scalability. The relatively small size of plant-based crop markets and commodity nature of pulse crops make joint investment and cost-sharing mechanisms vital.

Project 3: Farmer Rewarding Strategies (€100m)

Rewarding strategies for farmers, recognizing legumes' environmental benefits—such as green cover and crop rotation—through eco-schemes and rural development programs focused on climate and environmental management is essential. These schemes should incentivize practices that enhance ecological value, improve soil health, and contribute to climate goals. Ensuring fair value distribution across the supply chain will help breeders and farmers benefit equitably. This will requite more stakeholder engagement.

Besides the three flagship projects, smaller projects can be found in Annex 1 and total investments equal €360m for 2026-2035, with the result of positioning Europe as a global leader in sustainable plant-based food and protein systems.

4.5 | Better Crops, Raw Materials & Crop Diversification

Innovation Pillar 5

4.5.1 Higher Protein Crop Yields & More Resilience

Over the past six decades, EU acreage for main oilseeds expanded sixfold, while legume area shrank sixfold between 1961 and 2007, though it has since grown moderately. Farmers frequently cite lower economic returns for legumes compared to cereals and oilseeds. This dynamic created a negative feedback loop: reduced legume production diminished their use in value chains, curtailing investments in agronomy, breeding, advisory services, and processing, thereby further suppressing legume cultivation and demand.

The limited legume cultivation area discourages strong breeding program development. The lack of research and innovation investments is clear when comparing the number of wheat varieties (2,234) registered in 2015 in the European Union's Common Catalogue of Plant Varieties to those registered for field peas and beans (392) (European Commission, 2016).

Between 2020–2024, public-private partnership investments in crop development are estimated at €170–330m, with the European Commission contributing €56m and member states providing significant support across regions (see Table 2).

Table 2

Investments in plant-based R&I in crop development in Europe (January 2020-April 2024, €m) (GFI, 2024)

Public-Private Partnership Investments	€ million
European Commission	€56m
European Members States	
• Nordics (Denmark, Finland, Norway, Sweden)	~ €10m
• DACH (Germany, Austria, Switzerland)	~ €20m
• UK & Ireland	~ €5m
• South-west Europe (France, Spain, Portugal)	~ €7.5m
• Netherlands-Belgium	~ €2.5m
Total	**€100m**

Efforts to close yield gaps and improve protein crop production stability across food, feed, and pet food sectors are, however, still needed. Innovative breeding technologies—speed breeding, hybrid seeds, genomic selection—can be applied to enhance climate resilience. The currently low arable land share for pulses (3%) and knowledge gaps calls for integrated approaches involving farmers, researchers, and organisations to foster adoption and increase European food security.

There is also an increasing need for the development of new crop protection methods. Every year, more substances (herbicides, insecticides, and fungicides) are losing their approval, resulting in a smaller selection of available crop protection products. Consequently, farmers will also be limited in their ability to apply a variety of substances, which could potentially increase the risk of tolerant weeds, for example. Neophytes are also becoming an increasing issue (e.g. stink bugs).

This report calls for a full focus of innovation investments on the following crops: soy, pea, faba bean, sunflower, and oat. Rather than divert future innovation investment budgets over too many other plant-based crops such as lentils, mung bean, algae, and for instance insects.

To build on this foundation, a future R&I investment budget of €155m is proposed for 2026–2035 to scale protein crop production and innovation across Europe.

4.5.2 Better Protein Crop Properties, Functionalities & Nutritional Value: Multidisciplinary!

Very little crop development has focused on optimising plant protein sources for application in specific plant-based foods. Optimising crops for improved protein content, quality, nutrition, and functionality can help to avoid costly and time-consuming downstream processing and improve the sensory and nutritional profiles of various plant-based food with similar profiles as dairy, meat, eggs, fish, as well as to animal-based ingredients for foods (i.e., milk powders for bakery, gelatin in candy, or egg albumin in surimi applications). Sustainable ecosystems & networks connecting breeders, farmers, food ingredient processors, food brands, retailers, and food service operators are hardly present. Thus, the awareness amongst farmers and breeders of industry needs for (future) plant-based foods and ingredients is low. This is also related to the current stage of industry development. Profitable knowledge exchange models exist in, e.g., a mature market like frozen vegetables.

Fundamental research on the relationships between protein sequence, structure, functionality, nutrition, LCA's, and other sustainability criteria and ultimately performance in plant-based food products including hybrids based on dairy proteins, cultured meat and or precision fermentation is required for different crops & different varieties and regions (differences in growing conditions, climate, and soil types may impact performance).

Immediate efforts should prioritize collaborative research initiatives that address these multifaceted aspects of plant genetics, food science and processing, nutrition, and sustainability.

The European future research & innovation investment to scale the past work on better protein crop properties, functionalities & nutritional value in 2026-2035 is €25m.

4.5.3 European Protein Crop Database

The abovementioned research must lead to a database for European protein crops with annual updates on varieties, growing and storage conditions, protein sequence, structure, functionalities, nutrition, and processability. While the objective of creating a database for European protein crops is clear and necessary, successful implementation will require careful planning, collaboration, and continuous investment in resources to ensure its effectiveness and sustainability in supporting the protein crop sector.

Building such a comprehensive database is crucial for consolidating information that can support researchers, breeders, and farmers in making informed decisions regarding protein crops. It will be essential to ensure its ongoing maintenance and regular updates. This requires dedicated resources and a collaborative framework involving researchers, agricultural organizations, and industry stakeholders.

The before-mentioned road map and multidisciplinary work will then cover the development and agreement of standardized data collection and entry methods.

The total innovation investment budget to develop and maintain this database in 2026-2035 is at €45m.

4.5.4 Total Innovation Investments for Better Crops, Raw Materials & Crop Diversification

The total research & innovation investment budget for 2026-2035 is estimated at €220m (Table 3).

Table 3

Total Innovation Investments for Better Crops, Raw Materials & Crop Diversification (2026-2035, €m)

Innovation Investment 2026-2035	€ million
Higher Protein Crop Yields & More Resilience	€150m
Better Protein Crop Properties, Functionalities & Nutritional Value	€25m
Protein Crop Database	€45m
Total	**€220m**

4.6 | Harmonisation of Methods & Regulations

Innovation Pillar 6

Advancing the harmonisation and standardisation of industrially produced plant-based proteins and foods is crucial to enable the sector's scalable growth and support the EU Competitiveness Compass, Food Security, Strategic Autonomy, and objectives for a climate-neutral, circular economy. Compared to traditional animal-based foods, plant-based food is a new and dynamic segment, requiring dedicated research and innovation investments to establish harmonised frameworks and regulatory alignment across the Single Market.

To this end, the focus is on the following four strategic projects, leveraging public-private collaboration and multi-actor engagement:

1 | Development of more and better analytical and sensorical methods as well as application relevant model systems for plant-based foods and proteins to accelerate the development of better plant-based foods as well as new ingredients from existing, new side-streams and new protein sources.

2 | Development of rapid tests for assessing the quality of legumes. Legume processors and agricultural traders would benefit from tools that can predict the processing suitability of legumes. For example, the suitability of soybeans for making tofu can be predicted, just as the suitability of wheat for bread is predicted.

3 | Development of rapid tests for assessing the isoflavone content. It is important to push for development of knowledge on soya beans for human food crops with lower isoflavone content (ANSES, 2025).

4 | Acceleration of regulatory approval for rubisco, new fungi/yeast, algae, bacterial proteins.

The total budget investment for all projects in harmonisation of methods from 2026 to 2035 is €45m.

Plant proteins tend to miss out when analytical methods for monitoring food quality and safety are developed. There is therefore a real need to develop reliable and harmonised methods. The investment in regulation innovations between 2026-2035 is €150m.

The total innovation investment for all projects in harmonisation of methods and regulations is €195m (2026-2035).

4.7 | Unique Digital Innovation, AI & Smart Food Systems

Innovation Pillar 7

Establishing a robust AI-driven knowledge infrastructure for plant-based food systems and protein crop sciences is essential to support the European Union's objectives in enhancing the quality, diversity, and security of sustainable food systems. Strategic investment in advanced artificial intelligence will reinforce the EU's position in fostering scientific excellence, underpinning the Competitive Compass, Food Security, Strategic Autonomy, and Bioeconomy strategies, and accelerating the uptake of innovative technologies in the agrifood value chain.

The academic led AlphaFold Protein Structure Database sets a great example for open, collaborative research and innovation platforms. Leveraging such models, the creation of an AI innovation ecosystem - provisionally called AlphaFood - will provide Open Access to predictive tools and datasets relevant for plant-based proteins and food ingredients. It could also be applied to ingredients made by precision fermentation as well as products made by cellular agriculture.

AlphaFood will be designed as an open-source, multi-stakeholder research environment accessible across the scientific community, public sector, and industry. Its objectives include accelerating Research & Innovation cycles, streamlining operational costs, enhancing nutritional quality (including taste and texture), valorising agri-food side streams, and integrating sustainability metrics into plant-based food design.

AlphaFood requires a stepwise approach:

Step 1	Step 2	Step 3	Step 4	Step 5
Develop high-throughput experimentation infrastructures for profiling the techno-functional properties of minimally processed plant ingredients.	Standardise data structure on experimental characterisation (step 1); establish a model to share experimental data between stakeholders while recognising sovereignty, ownership and confidentiality.	Build advanced AI models (an 'AlphaFold' analogue) for ingredient functionality, mapping the relationships between raw material origin, processing technologies, and functional attributes, based on curated experimental datasets.	Develop process systems engineering frameworks to design, optimise, and simulate full agri-food value chains, integrating predictions of digestive, nutritional, sensory, and techno-functional characteristics via AI-driven tools (described in step 3).	Develop a user-oriented, modular software environment to guide holistic formulation, processing decisions, and crop selection, supporting predefined consumer food portfolios and fostering market uptake of sustainable plant-based products.

The Research & Innovation investment for AlphaFood is €50m between 2026–2035.

5 | Key Takeaways and Policy Directions

The European market for plant-based foods is valued at around €2 billion (Smart Protein, 2024), compared to €450 billion for animal-based industries. Although the plant-based sector has grown significantly over the past decade, it remains small in relative terms, leaving considerable potential to expand.

Consumer research highlights that improvements in affordability, nutritional composition, taste, texture, and shelf life will be decisive in making plant-based foods more widely available, diverse and accepted.

Equally important is supporting the scale-up of existing plant-based solutions. This also includes simplifying the approval process for bringing innovations to the EU market.

This report serves as a **playbook for the EU, national governments, and industry stakeholders,** providing concrete guidance on where investment is needed to accelerate the protein transition. It also highlights opportunities for collaboration, efficiency, and scaling up plant-based diets. The seventy-five project ideas include concrete budgets, offering stakeholders such as the European Commission practical input for current and future initiatives.

It outlines 75 innovation projects across seven pillars, together representing an investment need of €3 billion by 2035 (Table 4) three times more compared to 2020–2024 funding levels. Such an increase is essential to close the gap with global competitors and deliver tangible results: by 2035, the share of plant-based foods in Europe's total protein consumption is projected to rise from 40:60 to 50:50, supported by new value chains for key crops such as soy, pea, faba bean, sunflower, and oat.

Between 2020 and 2024, many EU Member States invested in national public-private research projects to boost plant-based food & protein innovation. The Good Food Institute (GFI) compiled these investments, reporting that research and innovation funding in Europe totaled nearly €400 million during this period (GFI, 2024).

To accelerate progress, we forecast that Europe will need to scale investment. This expanded investment aligns with the growing ambition and funding commitments seen across Europe, where public and private investment in plant-based foods & proteins has risen sharply in recent years.

The proposed investment mix reflects different priorities than past EU and national research programmes. Around 40% (€1.2 billion) is directed to consumer engagement and health, another 40% to sustainable products, circular economy and crop innovation, and the remaining 20% to roadmaps, supply chains, harmonisation, and digital tools. This rebalancing recognises that scaling consumption and ensuring consumer trust are just as important as technical improvements in production.

Table 4
Total Investment Budget for seven Innovation Pillars to increase More Plant-Based Foods Production and Consumption (2026-2035, €m)

Innovation Investment Budget (€)	
1 Increased Consumers Engagement & Food Environments	€720m
2 Improved Health & Nutrition	€455m
3 More Sustainable Products & Circular Bioeconomy	€995m
4 New Roadmaps, Supply Chains & Ecosystems	€360m
5 Better Crops, Raw Materials & Crop Diversification	€225m
6 Harmonisation of Methods & Regulations	€195m
7 Unique Digital Innovation, AI & Smart Food Systems	€50m
Total	**€3b**

The plant-based foods & protein industry focusses the attention on different Innovation Pillars, when compared to research & innovation investments of the European Commission and Member States between 2020-2024.

Each of the seventy-five projects has a budget. Some are small, some big. Some detailed and some will need further detailing due to its size. Some Pillars like Pillar 1 on Increased Consumers Engagement & Food Environments may need a further budget boost to accelerate the protein transition.

This budget is, however, not conclusive by innovation pillars, by crops and or by projects. The collaborative work on this innovation investment budget will need to be continued annually, including frequent meetings between all stakeholders, including also other stakeholders, than industry members of the European Plant-Based Foods Alliance, Plant-Based Foods Europe, and Euvepro. These members have provided their ideas and preferences based on their collective market outlook.

Other stakeholders to be included in the future are (see also Innovation Pillars 4 and 5): farmers, farmer organisations, breeders, technology providers, (national, and regional) governments, national networks, consumer organisations, etc.

Delivering this playbook will require a broader coalition. Future work must involve not only industry associations such as the European Plant-Based Foods Alliance, Plant-Based Foods Europe, and EUVEPRO, but also farmers, breeders, technology providers, consumer organisations, national and regional governments, and research networks. A multi-disciplinary approach to the protein transition is indispensable – both across the value chain and across the European Commission's services (DG AGRI, DG RTD, DG SANTE, DG GROW, DG ENV, DG JUST, DG CNECT, DG FISMA/ECFIN). The first roadmap for oats (see Innovation Case 1) should be followed by similar roadmaps for other key protein crops, creating a foundation for a resilient and competitive European food system.

Finally, this report calls for stronger alliances between the European Commission (Horizon Europe), Member States, and industry, similar to the Circular Biobased Europe partnership. Coordinated regional initiatives across Europe can further concentrate investment, reduce duplication, and accelerate the success of innovation projects.

6 | Recommendations

This Innovation Investment Budget is designed to directly support the EU's strategic priorities. The proposed actions and seven innovation pillars align closely with existing policy frameworks and funding instruments across the European Commission. From research and health to agriculture, environment, industry, digitalisation, and finance, plant-based foods and proteins offer solutions that cut across portfolios. By embedding this agenda into EU policy, the Commission can accelerate the protein transition, maximise the impact of public investment, and ensure Europe remains competitive, sustainable, and responsive to citizens' needs.

Each innovation pillar contributes to the mandates of different Commission services (Table 5). It illustrates the breadth of the agenda's relevance: from Horizon Europe and CAP support for crop diversification, to health and nutrition policies, market regulation, environmental objectives, digital innovation, and investment frameworks. This mapping underlines that the protein transition is not a niche agenda but a cross-cutting European priority requiring coordinated action across the Commission.

Table 5
Alignment of the Innovation Investment Pillars (2026-2035) with policies of European Commission

DG	Area of Interest Relevant to Plant-Based Innovation	Topics	Fit with Innovation Pillars*
DG RTD	Research & Innovation	Horizon Europe, R&D funding	**1, 2, 3, 4, 5, 6 & 7**
DG SANTE	Health, Nutrition & Food Safety	Nutrition & health policies, food safety	**2, 6**
DG AGRI	Agriculture, Crop Diversification	Protein crop policies, CAP, farm support	**1, 2, 3, 5, 6**
DG GROW	Market regulation, Industry & Standards	Regulatory harmonization, market competitiveness	**6**
DG ENV	Environment & Sustainability	Life cycle impacts	**4, 5**
DG JUST	Consumer protection & food labelling	Labelling, marketing standards	**1, 6**
DG CNECT	Digital innovation & AI	AI, data systems, digital food innovation	**4, 5, 7**
DG FISMA/ECFIN	Investment frameworks	Funding, incentives for innovation ecosystems	**4**

* Innovation Pillars: 1. Increased Consumers Engagement & Food Environments, 2. Improved Health & Nutrition 3. More Sustainable Products & Circular Bioeconomy, 4. New Roadmaps, Supply Chains & Ecosystems, 6. Better Crops, Raw Materials & Crop Diversification, 6. Harmonisation of Methods & Regulations, 7. Unique Digital Innovation, AI & Smart Food Systems

Unique Industry Vision & Collaboration

This report is the outcome of a unique leadership and collaboration from European R&D and innovation leaders from the Plant-Based Foods Europe, European Alliance for Plant-Based Foods, and Euvepro, as well as input and ideas from industry and research organisations such as: Alpro, Oatly, Liquats Vegetals, Nutrition & Sante, Nestle, Unilever, General Mills, Hilcona, Simply V, Hochland, Quorn, Savencia, Upfield, Migros, KraftHeinz, Kerry, Lantmannen, IFF, Roquette, DSM Firmenich, Cosucra, Cosun, ADM, Amano Enzymes, Avebe, Corbion, Doehler, Emsland, Fuij Europe, GoodMills, ICL, Ingredion, Givaudan, Symrise, Brabender, Flottweg, Foss, GEA, Hosokawa, Pall, Poittemil, ST Equipment, Wenger, Wageningen University, KU Leuven, Reading University, Weihenstephan Hochschule, Ainia, CSIRO, DTI, ILVO, Improve, INRAE, IRTA, RISE, VTT, and the ShakeUpFactory.

About

Plant-Based Foods Europe
Plant-Based Foods Europe is the industry association representing internationally active companies producing plant-based foods. Its members include well-known companies such as Danone, Valsoia, Olga, Nutrition et Santé Group, Liquats Vegetals, and Oatly.

European Alliance for Plant-Based Foods
The European Alliance for Plant-Based Foods (EAPF) is a multi-stakeholder coalition comprising NGOs, industry players, consumer groups, and researchers dedicated to advancing plant-based food systems.

European Vegetable Protein Association
EUVEPRO is the European Vegetable Protein Association, representing manufacturers of plant-based protein ingredients for human consumption across Europe. Founded in 1977, EUVEPRO brings together leading companies committed to delivering high-quality, safe, and sustainable protein ingredients used in a variety of food products. Members include ADM Specialty Ingredients, BENEO, Cargill, Cosucra Groupe, dsm-firmenich, IFF, Ingredion, Kerry Ingredients & Flavours, Roquette, and Royal Cosun.

FoodConNext Foundation
The FoodConNext Foundation's vision is focused on accelerating the transition to a sustainable, plant-based, and protein-diverse food system in Europe. It aims to create a positive movement to unlock breakthrough solutions. Gerard Klein Essink, Founder & CEO of the FoodConNext Foundation, authored this report. He ran for 20+ years an international plant-based foods and proteins community, published numerous industry reports, written various innovation reports on proteins for the Dutch government, advised the Canadian government on its pulse strategy, and produced strategic outlook reports for Pulse Canada and the Australian Grains Research Development Council.

Annex

Annex 1: 75 Innovative Projects to Boost Innovation Power in Europe by Innovation Pillar

This overview also contains specific projects on oats, while these are presented as part of a focused road map for oats. It will be key in the future to develop such road maps for soy, pea, faba bean, and sunflower.

Innovation Pillar 1: Increased Consumers engagement & Food Environments (€720m)

Project	Budget (€)
Developing effective national, regional and city strategies to facilitate and to create an environment to make plant-based foods more accessible and affordable for consumers	€300m
Developing nudging strategies to have consumers try, evaluate, and repurchase including the influence of taxes and levies, true pricing, sustainability, and CO2 impacts on menu changes in foodservice	€300m
Developing effective retailing (bricks & mortar supermarkets as well as digital) and food service strategies to accelerate the transition towards plant-based foods	€100m
Early-Life Exposure and Cultural Integration of Oats: Shape future consumer preferences by targeting early-life exposure and cultural integration of oat-based products through sensory profiling and preference mapping in infants, children, and adults across EU regions	€10m
Living Labs for Oat-Based Innovations: Establish living labs where small and medium-sized enterprises (SMEs) can collaborate with researchers, farmers, and consumers to evaluate, refine, and scale oat-based innovations	€10m

Innovation Pillar 2: Improved Health & Nutrition (€455m)

Project	Budget (€)
Determination of the health effects of moving to plant-based diet (high fibre, vitamins, phytochemicals, low in SFA) on general health via long-term epidemiological studies including prevention of CVD, high cholesterol, T2D, obesity, nutrient deficiencies etc.), and the long-term effect of an increased intake of plant-based food diets on the health of specific consumers (elderly, infants and vulnerable), diseases (Cancer, Alzheimer, Parkinson) and people with very strict diet or with eating disorders.	€300m

Embedding oats and other plant-based foods into Dietary Guidelines: Align research with policy to embed oats into dietary guidelines, public procurement, and sustainability frameworks, ensuring systemic change across health, agriculture, and climate sectors. Include school and social media campaigns on oat farming, recipes, and sensory education to build early appreciation for oats	€25m
Development of knowledge on the effect of protein ingredient technologies (milling, extraction, spray drying, extrusion) and protein purity (flours, concentrates, isolates) on protein ingredients and plant-based food digestibility	€25m
Defining for older adults a balanced healthful plant-based diets, considering differential effects on various health parameters (e.g., metabolic, muscle) and potential differences in bioavailability of foods (processed)	€25m
Defining for older adults the meal quality of currently consumed/ recommended meals using available meal-based protein quality tools in different settings (home, hospital)	€25m
Randomised Controlled Feeding Studies on Oats: Design and conduct rigorous randomised controlled feeding studies to determine the efficacy of oat products and oat components on human gut microbiome, metabolomics, and endocrinology in mitigating poor health	€25m
Novel measures of dietary oat exposure: Validate and incorporate novel objective measures of dietary oat exposure, such as avenanthramides and avencosides, in culturally and socioeconomically diverse populations for the study of inter-relationships of oat consumption and well-being in culturally diverse groups in epidemiological studies	€10m
Prospective Cohort Data on Oat Consumption: Facilitate generation of prospective cohort data by incorporating questions on oat consumption into dietary assessments, thereby advancing our understanding of the influence of oat-based products on public health challenges, including non-communicable diseases	€10m
Mechanistic Studies on Oats and Gut Microbiome: Apply validated metrics and analytical approaches in mechanistic studies to clarify how oats and oat products modulate gut microbiome function and its interplay with host metabolism in relation to health outcomes	€10m

Innovation Pillar 3: More Sustainable Products & Circular Bioeconomy (€995m)

3.1 Projects on Better Taste, Texture & Nutrition (€375M)

Project	Budget (€)
Development of juicier, succulent, sustainable & healthy oils & fats. The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€50m
Development of more knowledge on improving the functionality of pulses concentrates vs. isolates	€50m

Development of better advanced masking systems to reduce astringent or beany notes (off notes of plant-based proteins). The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€25m
Development of better sustainable fats that provide functionality as animal fat (marbling fat and muscle fat) with nutritional value as healthy liquid oil. The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€25m
Development of better solutions to methyl cellulose that provide the texture and binding properties for meat-free formulations.	€25m
Development of fundamental knowledge on plant protein properties and functionality vs casein micelles and whey proteins	€25m
Development of improved flavor and aroma systems as well as colour systems that mimic meat products for precook and post cook colors including the degree of cooking (i.e., rare, medium, well done). The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€25m
Development of knowledge on how processing, ripening of plant-based foods and proteins is different from dairy-based cheese to improve the consumer food product. The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€25m
Development of more knowledge to better understand the physical state of the plant-based protein (fermented, isolated) and its impact in the off notes and masking. The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€25m
Development of more knowledge to further improve the stability of plant-based dairy-free foods to heating and cooking (destabilisation or expulsion of oils/fats will lead to rejection). The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€25m
Development of new protein texturization methods for non-soy protein sources that can deliver meat like texture in meat-free	€25m
Development of new process and ingredients to provide more juiciness/ succulent in meat-free products once cooked	€10m

Oat Varieties with Minimal Rancidity Development: Develop oat varieties with minimal rancidity development to require less extensive heat treatment during kilning, thereby making oat raw material a more sustainable ingredient by lowering energy consumption, preserving nutritional quality, and extending shelf life	€10m
Tailoring Oat Products to European Food Cultures: Develop and tailor oat products (foods and drinks) to food cultures and taste preferences within people living in Europe and considering different typologies (urban/peri-urban/rural), ages, gender, and social and economic contexts by use of citizen science and living labs	€10m
Development of new natural water binding materials that offer a replacement for synthetic additives such as methyl cellulose. The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€10m
Development of new vegetable oils & fats which give more even browning/less burning than butter. The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€10m

3.2 Projects on Novel Processing Methods (€620m)

Project	Budget (€)
Development of affordable new processing technologies and thus create better economic business models for the ingredient industry and to lower the (protein) ingredient cost.	€100m
Development of knowledge on adding more value to side-streams (for starches & fibres) to create new usage opportunities, more efficiency, affordability, and sustainability to create better economic business models for the ingredient industry and to lower the (protein) ingredient cost.	€100m
Development of a new modular fully integrated in-situ processing technology solution for pulses based on a 100% usage of the full pulse in plant-based foods with minimal energy and water usage, no waste and limited CO2 release to create better economic business models for the ingredient industry and to lower the (protein) ingredient cost.	€50m
Development of more knowledge on the impact of food processing steps (homogenization, pasteurization, sterilization, extrusion) and plant protein structuring on protein digestibility and bioavailability of plant-based foods	€50m
Development of better traditional processing methods (water-based protein extraction, coagulation of water-soluble plant proteins and fermentation of whole seeds) for making ‘natural’, plant-based protein foods (tofu, tempeh, seitan)	€25m
Development of knowledge about legume functionalities for different applications, such as plant-based drinks, tofu, seitan, tempeh, including “traditional low processed processes, suitable also in organic”	€25m

Optimizing Oat Processing Methods: Develop and optimize oat processing methods such as milling, dry and wet fractionation, and precision fermentation, focusing on innovations in low-energy, low-waste technologies to improve efficiency and environmental footprint. This will lead to higher quality and more sustainable oat-based products	€25m
Utilizing Oat Processing Side-streams: Investigate and implement methods to utilize oat processing side-streams for the creation of bio-based products and packaging that are superior in performance and sustainability compared to traditional versions, reducing waste and creating new value streams in alignment with a circular economy	€25m
Development of knowledge on better ingredients that provide heat setting, emulsification, to replace milk and egg proteins. The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€25m
Development of more ingredient quality consistency (no standard isolates / concentrates)	€25m
Development of more knowledge on better separation methods to deliver clean taste/enhanced functional performance. The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€25m
Development of more knowledge to understand the protein-protein interaction for plant-proteins and ingredients to improve melting/stretching properties for cheese substitutes. The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€25m
Development of more knowledge and transparency on optimal harvesting point & time to get the best quality raw material for making the best plant-based foods	€25m
Development of new fat and moisture encapsulation techniques for sustainable protein applications	€25m
Development of new production process innovations for fibre formation and improved plant protein texturization. Extrusion is a well-established technology for making textured vegetable proteins, evolutions such as high moisture extrusion (HME) offer new opportunities for product innovation with new ingredients.	€25m
Development of new separation targets: Development of mild methods to separate all plant proteins in a crop without having to use extensive salt or pH shifts (which then cause dietary issues in formulated products)	€25m
Enhanced Milling Efficiency for Oats: Develop oat varieties with enhanced milling efficiency to reduce milling side streams and improve overall processing yield.	€10m
Development of new ingredient processing technologies to improve plant protein functionality with a better solubility, and gelling. The currently available options of suppliers do not fully meet the consumer and food industry producer demands related to cost or affordability, clean label and sustainability, functionality, taste, and nutritional profile.	€10m

Innovation Pillar 4: New Roadmaps, Supply Chains & Ecosystems (€385m)

Project	Budget (€)
The knowledge on traits needed for food application is available, however, this may be known to a small group of leading companies. The big missing element is that breeding for ingredients with the current business model is only initiated above a certain scale and therefore it hardly happens. Changing business models and sharing the knowledge openly may facilitate. So, sustainable ecosystems & networks connecting breeders, farmers, food ingredient processors, food brands, retailers, and or food service operators are hardly present. Thus, the awareness amongst farmers and breeders of industry needs for (future) plant-based foods and ingredients is low. This is also related to the stage of development of industry at present. Profitable knowledge exchange models exist in e.g., a mature market like frozen vegetables. Focus on developing more robust networks that encourage communication and collaboration among breeders, farmers, processors, retailers, and food service operators as well as increasing awareness and educational initiatives targeting farmers and breeders to ensure they understand industry needs and trends related to plant-based foods and ingredients. And encourage partnerships and collaborations that can foster innovation and adaptability in response to market changes and sustainability goals.	€100m
The development of regional and European supply chains for protein crops (focus on soy, pea, faba bean, sunflower, and oat). European road maps for all crops are essential, which can lead to a concise plan, connecting food security and competitiveness strategies with aligned agricultural acreage plans and farmer (organisations) and food industry annual commitments. These road maps should be are part of an investment and support for setting up ecosystems along the farm-to-fork value chain on the before mentioned crops, retailers & food service operators, as well as food brands, who are making plant-based meat-free, dairy-free, beverages, yogurts, cheese, egg-free, fish-free, bakery & baked goods, powdered foods, and ready meals, food ingredient suppliers, institutes and universities, technology suppliers, representative organisatons, farmer organisations, breeders, and national governments. There is a need to commoditise legumes to establish regional and European value chains.	€ 100m
Development of rewarding strategies for farmers for the benefits of legumes for the environment and climate objectives (such as green cover or crop rotation) through Eco-schemes and environmental/-climate management commitments under rural development programs are key for further progress (continuation of the Valpro project). Moreover, a fairer shared margin across the value chain, in which breeders and farmers more beneficially share in the added value of pulses for food products. While the necessity for developing rewarding strategies for farmers to promote the benefits of legumes is clear, creating effective eco-schemes, and engaging stakeholders is also important. Addressing this research field effectively could enhance sustainability in agricultural practices, improve soil health, and contribute positively to climate objectives. Establishing effective eco-schemes and commitments related to environmental and climate management under rural development programs is crucial. These schemes should incentivize farmers to adopt practices that enhance the ecological value of their farming operations.	

There may be a gap in awareness among farmers regarding the specific benefits of legumes and the available support for implementing such strategies. Educational initiatives promoting understanding and adoption of these practices are key. Engaging various stakeholders, including farmers, agricultural organizations, and policymakers, will be necessary to design effective strategies that are practical and appealing to farmers. Their input can help ensure that the proposed schemes are relevant and beneficial. It is important to integrate mechanisms for monitoring and evaluating the effectiveness of the proposed eco-schemes. This will provide insights into their impact and help adjust strategies as needed to maximize benefits for both the environment and farmers.	€100m
Establishment of Oat in Regenerative Agriculture: Establishment of Oat as a key component in regenerative agricultural systems. By utilizing existing and newly developed oat varieties in intercropping systems, this research will enhance productivity, biodiversity (including soil microbiomes), and ecosystem services. This will promote sustainable and environmentally friendly farming practices, positively impacting the soil's ability to store carbon, retain moisture, suppress disease, prevent erosion, and support crop yield potential. (5 project)	€25m
Development of a European Research Centre for natural and low-processed plant-based foods such as tofu, tempeh, seitan. Investments into R&D for these products have been low despite their long tradition and established market position in Europe and their potential role for the European Protein Transition. This Centre will fill an important gap and play a central role in new ecosystems around the improvement of these types of foods, in terms of yield, nutrition, the application of new crops, the development of test methods such as rapid functionality testing, academic research, scaling laboratory research to pilot scale, consumers understanding, and communication	€25m
Development of new ecosystems: The future of plant-based foods and supply industries will be determined by transparency and affordability. How to increase the value chain transparency related to origin and production methods is to be investigated. Steered and facilitated by CSRD/ESG insights and measured that drive the carbon tax benefits. Pulse crops are, owever, commodities.	€25m
European Oat Knowledge Platform: Establish an open-access European Oat Knowledge Platform that integrates genomic, phenotypic, agronomic, and techno-functional data. Utilize artificial intelligence (AI) to analyze and interpret these extensive datasets, facilitating the precise and efficient identification of key traits and relationships.	€10m

Innovation Pillar 5: Better Crops, Raw Materials & Crop Diversification (€225m)

Project	Budget (€)
Development of new knowledge in protein crops (focus on soy, pea, faba beans, sunflower, and oats) to increase yield gaps and reduce yield variability, and to increase production of protein crops in Europe are important. It is also necessary to invest in breeding resources to reduce knowledge gaps for pulse crops. Examples of needed breeding resources are speed breeding, hybrid seed breeding, genomic yield selection, and breeding for changing climate conditions. While the need for research in protein crops, particularly pulses, is clear, there are significant challenges related to knowledge gaps and collaboration Fostering a more integrated approach involving breeding, agronomy, and farmer engagement will be critical to enhancing the production and adoption of protein crops within European agriculture. Strengthening relationships and collaboration among farmers, researchers, and agricultural organizations is essential for sharing knowledge and best practices, which can drive the adoption of protein crops on a larger scale.	€85m
Development of new crop protection methods for the following pulses: soy, pea, faba, lentils, mung bean. Every year, more substances (herbicides, insecticides, and fungicides) are losing their approval, resulting in a smaller selection of available crop protection products. Consequently, the limitation to applying a variety of substances could increase the risk of tolerant weeds, for example. Neophytes are also becoming an increasing issue (e.g., stink bugs) Methods of crop protection that really target the needs of legumes are scarce. Agri-chemical companies focus more on big cash crops than on “niche crops” like peas, beans, and non-GMO soybeans in Europe, not to mention lentils and chickpeas.	€25m
Resilient Oat Varieties for Diverse EU Climates: Creation of oat varieties that are resilient to diverse EU climates, capable of withstanding biotic (e.g., pests, diseases) and abiotic (e.g., drought, extreme temperatures) stresses.	€25m
Development of fundamental knowledge on the relationships between protein sequence, structure, functionality, nutrition, and performance in plant-based food products will scale the suage of different crops & different varieties and regions as well as sustainable processing technologies (link to Innovation Pillar 3). While the call for fundamental research on the relationships among protein characteristics and their performance in plant-based food products is clear, comprehensive studies across various crops, varieties, and regions are also important. Linking this research to sustainable processing technologies will further enhance the relevance and impact of the findings, contributing to the advancement of plant-based food science and sustainability initiatives. Immediate efforts should focus on prioritizing collaborative research initiatives that address these multifaceted aspects to fully realize the potential of plant proteins in future food systems. The necessity for research on various crops and diverse varieties is crucial. Understanding how different plant proteins behave can inform the development of higher-quality plant-based food products tailored to consumer preferences and nutritional needs. The performance of these proteins can vary significantly by region due to differences in growing conditions, climate, and soil types. Research initiatives should account for these variations to provide relevant insights across different agricultural systems.	

It is essential to connect this research with sustainable processing technologies. Investigating how various processing methods impact protein functionality and nutritional profile will contribute to the overall quality and sustainability of plant-based foods. Encouraging collaboration among researchers in plant genetics, food science, and nutrition will be beneficial. A multidisciplinary approach can lead to innovative solutions that enhance the functionality of plant proteins in food applications. Having miniaturized equipment that allows the participating partners to evaluate small crop protein containing batches through small production and product batches will facilitate such relationships. There can also be a significant role for AI in this research area.	€25m
A database will need to be built and maintained for European protein crops with annual updates on varieties, growing and storage conditions, protein sequence, structure, functionalities, nutrition, and processability. While the objective of creating a database for European protein crops is clear and necessary, successful implementation will require careful planning, collaboration, and continuous investment in resources to ensure its effectiveness and sustainability in supporting the protein crop sector. Building such a comprehensive database is crucial for consolidating information that can support researchers, breeders, and farmers in making informed decisions regarding protein crops. It will be essential to not only develop the database but also ensure its ongoing maintenance and regular updates. This requires dedicated resources and a collaborative framework involving researchers, agricultural organizations, and industry stakeholders. Establishing standardized methods for data collection and entry will be important to ensure the accuracy and reliability of the information presented in the database. Such database can be built based also on an existing common catalogue and variety portal, which provides information including VCU.	€25m
Enhancing Nutritional Value and Safety of Oats: Identification and incorporation of traits that enhance the nutritional value and safety of oats	€10m
Comparative Studies on Oats and Other Crops: Comparative studies between oats and other crops in terms of nutritional profiles, environmental impact, sensory preferences, and cultural expectations	€10m
AI-Powered regenerative agriculture and smart farming platform: Build a pan-EU digital platform integrating satellite imagery, soil monitoring, and agronomic data to track the positive impacts of regenerative oat farming. AI tools will support precision agriculture, carbon accounting, and biodiversity monitoring, accessible to all actors in the oat value chain, with potential scalability to other protein crops.	€10M
AI-Integrated oat biorefinery and circularity platform: Develop a digital twin and circularity dashboard for oat biorefineries, integrating real-time sensor data, AI-driven process optimization, and circularity metrics. This platform will enable dynamic control of energy use, yield, and waste valorization, while supporting traceability, predictive maintenance, and sustainability reporting.	€10M

Innovation Pillar 6: Harmonisation of Methods & Regulations (€195m)

Project	Budget (€)
Acceleration of regulatory approval for rubisco, new fungi/yeast, algae, bacterial proteins	€50m
Developing reliable and harmonized methods for protein analysis	€100m
Development of more and better analytical and sensorical methods and application relevant model systems for plant-based foods and proteins to accelerate the development of better plant-based foods as well as new ingredients from existing, new side-streams and new protein sources.	€25m
Development of rapid tests for assessing the quality of legumes. Legume processors and agricultural traders would benefit from tools that can predict the processing suitability of legumes. For example, the tofu suitability of soybeans could improve the application.	€10m
Development of rapid tests for assessing the isoflavone content. It is important to push for Development of Know How on Soya beans for Human food crops with lower isoflavone content, while ensuring high protein content (competitive agricultural practices in EU)	€10m

Innovation Pillar 7: Unique Digital Innovation, AI & Smart Food Systems (€50m)

There is an extraordinarily strong link between the below AI projects and steps with data development in Innovation Pillar 3 (More Sustainable Products & Circular Bioeconomy) and Innovation Pillar 5 (Better Crops, Raw Materials & Crop Diversification)

Project	Budget (€)
Step 1) Development of high-throughput experimentation methods to characterize the functionality of mildly processed ingredients	€10m
Step 2) Standardise data structure on experimental characterisation (step 1); establish a model to share experimental data between stakeholders while recognising ownership and confidentiality.	€10m
Step 3) Developing an ‘alpha fold’ type AI model for ingredient functionality as function of the origins and processing history of food ingredients, based on the experimental database produced with steps 1 and 2.	€10m
Step 4) Develop a process system engineering environment that can be used to design the full processing chain and which predicts/estimates techno functionalities, digestive and nutritive properties, and sensory characteristics (this can be based on the ‘alpha fold’ AI model as described in step 3.	€10m
Step 5) Develop a software environment that identifies the overall window for formulation, processing and crop use that can be employed to produce predefined portfolios of consumer foods. A logic next step on top of step 4.	€10m

Annex 2: Roadmap Oats 2026-2035 (19 Key Projects)

This overview contains specific projects on oats. It will be key in the future to develop such road maps also for the following crops: soy, pea, faba bean, and sunflower.

Innovation Pillar 1: Increased Consumers engagement & Food Environments (€20M)

Project	Budget (€)
Early-Life Exposure and Cultural Integration of Oats: Shape future consumer preferences by targeting early-life exposure and cultural integration of oat-based products through sensory profiling and preference mapping in infants, children, and adults across EU regions	€10M
Living Labs for Oat-Based Innovations: Establish living labs where small and medium-sized enterprises (SMEs) can collaborate with researchers, farmers, and consumers to evaluate, refine, and scale oat-based innovations	€10M

Innovation Pillar 2: Improved Health & Nutrition (€80m)

Project	Budget (€)
Embedding oats and other plant-based foods into Dietary Guidelines: Align research with policy to embed oats into dietary guidelines, public procurement, and sustainability frameworks, ensuring systemic change across health, agriculture, and climate sectors. Include school and social media campaigns on oat farming, recipes, and sensory education to build early appreciation for oats	€25m
Randomised Controlled Feeding Studies on Oats: Design and conduct rigorous randomised controlled feeding studies to determine the efficacy of oat products and oat components on human gut microbiome, metabolomics, and endocrinology in mitigating poor health	€25m
Novel Measures of Dietary Oat Exposure: Validate and incorporate novel objective measures of dietary oat exposure, such as avenanthramides and avencosides, in culturally and socioeconomically diverse populations for the study of inter-relationships of oat consumption and well-being in culturally diverse groups in epidemiological studies	€10m
Prospective Cohort Data on Oat Consumption: Facilitate generation of prospective cohort data by incorporating questions on oat consumption into dietary assessments, thereby advancing our understanding of the influence of oat-based products on public health challenges, including non-communicable diseases	€10m
Mechanistic Studies on Oats and Gut Microbiome: Apply validated metrics and analytical approaches in mechanistic studies to clarify how oats and oat products modulate gut microbiome function and its interplay with host metabolism in relation to health outcomes	€10m

Innovation Pillar 3: More Sustainable Products & Circular Bioeconomy (€80m)

Project	Budget (€)
Optimizing Oat Processing Methods: Develop and optimize oat processing methods such as milling, dry and wet fractionation, and precision fermentation, focusing on innovations in low-energy, low-waste technologies to improve efficiency and environmental footprint. This will lead to higher quality and more sustainable oat-based products	€25m
Utilizing Oat Processing Side-streams: Investigate and implement methods to utilize oat processing side-streams for the creation of bio-based products and packaging that are superior in performance and sustainability compared to traditional versions, reducing waste and creating new value streams in alignment with a circular economy	€25m
Oat Varieties with Minimal Rancidity Development: Develop oat varieties with minimal rancidity development to require less extensive heat treatment during kilning, thereby making oat raw material a more sustainable ingredient by lowering energy consumption, preserving nutritional quality, and extending shelf life	€10m
Tailoring Oat Products to European Food Cultures: Develop and tailor oat products (foods and drinks) to food cultures and taste preferences within people living in Europe and considering different typologies (urban/peri-urban/rural), ages, gender, and social and economic contexts by use of citizen science and living labs	€10m
Enhanced Milling Efficiency for Oats: Develop oat varieties with enhanced milling efficiency to reduce milling side streams and improve overall processing yield	€10m

Innovation Pillar 4: New Roadmaps, Supply Chains & Ecosystems (€35m)

Project	Budget (€)
Establishment of Oat in Regenerative Agriculture: Establishment of Oat as a key component in regenerative agricultural systems. By utilizing existing and newly developed oat varieties in intercropping systems, this research will enhance productivity, biodiversity (including soil microbiomes), and ecosystem services. This will promote sustainable and environmentally friendly farming practices, positively impacting the soil's ability to store carbon, retain moisture, suppress disease, prevent erosion, and support crop yield potential	€25m
European Oat Knowledge Platform: Establish an open-access European Oat Knowledge Platform that integrates genomic, phenotypic, agronomic, and techno-functional data. Utilize artificial intelligence (AI) to analyze and interpret these extensive datasets, facilitating the precise and efficient identification of key traits and relationships	€10m

Innovation Pillar 5: Better Crops, Raw Materials & Crop Diversification (€45m)

Project	Budget (€)
Resilient Oat Varieties for Diverse EU Climates: Creation of oat varieties that are resilient to diverse EU climates, capable of withstanding biotic (e.g., pests, diseases) and abiotic (e.g., drought, extreme temperatures) stresses	€25m
Enhancing Nutritional Value and Safety of Oats: Identification and incorporation of traits that enhance the nutritional value and safety of oats	€10m
Comparative Studies on Oats and Other Crops: Comparative studies between oats and other crops in terms of nutritional profiles, environmental impact, sensory preferences, and cultural expectations	€10m
AI-Powered regenerative agriculture and smart farming platform: Build a pan-EU digital platform integrating satellite imagery, soil monitoring, and agronomic data to track the positive impacts of regenerative oat farming. AI tools will support precision agriculture, carbon accounting, and biodiversity monitoring, accessible to all actors in the oat value chain, with potential scalability to other protein crops.	€10m
AI-Integrated oat biorefinery and circularity platform: Develop a digital twin and circularity dashboard for oat biorefineries, integrating real-time sensor data, AI-driven process optimization, and circularity metrics. This platform will enable dynamic control of energy use, yield, and waste valorization, while supporting traceability, predictive maintenance, and sustainability reporting.	€10m

A new wind is blowing across Europe.

Everywhere, from laboratories to farmlands, the same awareness is growing: what we put on our plates can change the world. Not tomorrow, but now. The shift toward plant-based eating is not a limitation; it is liberating. It opens space for imagination, innovation, flavour, and collaboration.

Here, an economy is emerging that thrives without exhausting. Farmers are building soil health, technology is bringing us closer to nature, and food is once again breathing the promise of the future.

The Plant-Based Opportunity looks ahead to a Europe that is healthy, strong, and connected with each other and with the earth that sustains us.

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