

PDTT Foresight Study on the Future of Protein in Europe

(2025-2035-2050)



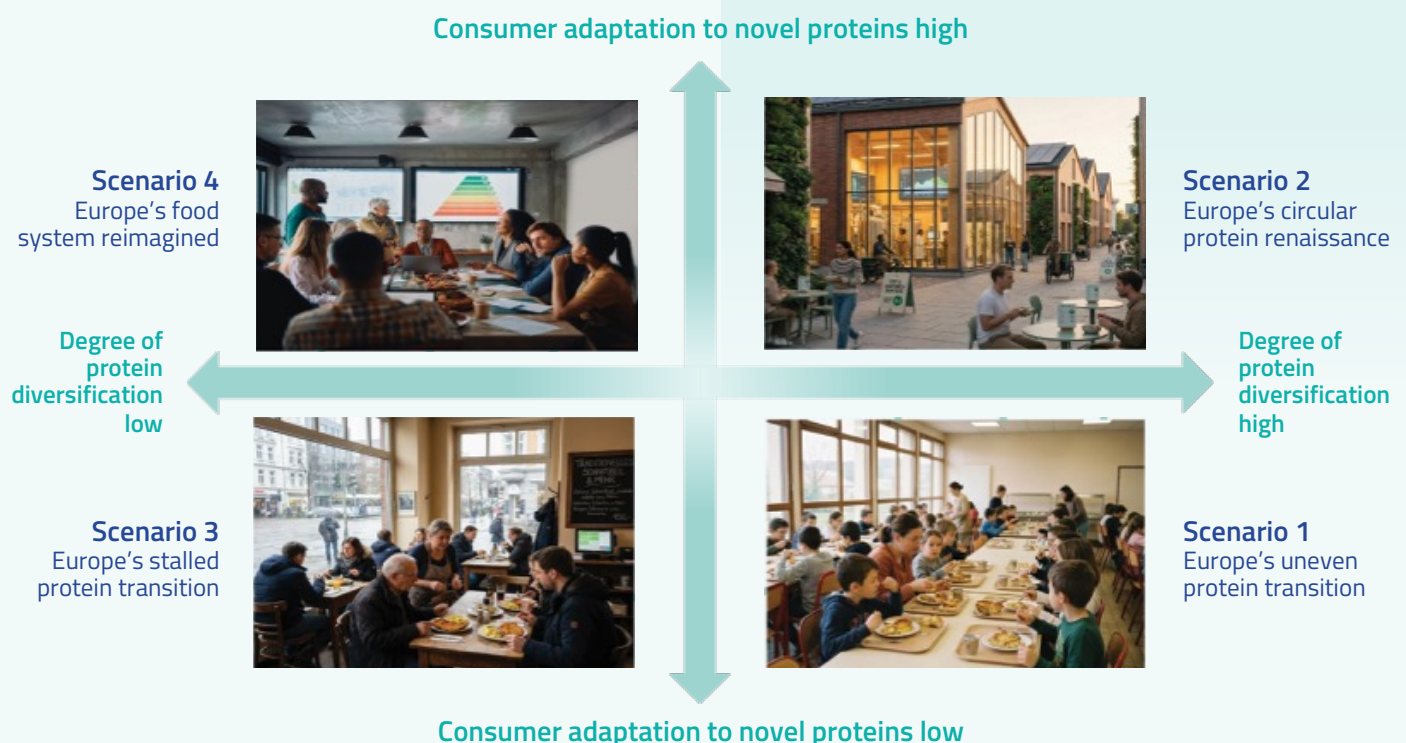
The European Union is at a pivotal moment in shaping the future of its food systems. With innovation strategies, funding frameworks, and regulatory approaches under review to support long-term sustainability, the diversification of food has emerged as a critical priority. The aim of this foresight study is to provide strategic, evidence-based insights that guide Europe's protein diversification transition and enables PDTT to contribute to building resilient, sustainable food systems.

The foresight study resulted in

- **Scenarios of possible futures:** Four scenarios for 2050 using VTT's ScenAlros tool, grounded on data and expert input by PDTT members.
- **Stakeholder engagement:** Survey-based evaluation of scenarios for relevance, probability, and desirability, including iterative refinement based on feedback. Altogether 131 participants representing different parts of the value chain and different European regions.
- **Roadmap towards a desired future:** A transition roadmap, identifying critical turning points and actions needed.

A vision statement was created based on the most desirable scenario of the future:

By 2050, Europe's food system is agile, cooperative, and inclusive, built on transparency, circularity, and shared accountability. Diverse food sources, from traditional livestock to plant-based and biotech innovations, coexist in a balanced ecosystem powered by renewable energy and resource efficiency. Governance adapts dynamically, enabling innovation while safeguarding safety and sustainability. Communities, industry, and policymakers collaborate to create resilient networks of food production and consumption, whereas personalization and cultural diversity shape everyday choices. Sustainability is effortless, trust is widespread, and Europe's competitive edge rests on cooperation and climate-positive practices, delivering abundant, healthy, and equitable diets for consumers.



Europe's Transition to a Circular Food System – Summary

Phase 1: 2025–2035 – Laying the Foundations

An EU-wide Protein Strategy aligns food, energy, and waste policies. Adaptive governance and conditional approvals accelerate novel protein adoption, supported by real-time monitoring. Distributed processing hubs convert side streams into protein ingredients, while modular manufacturing and crop breeding programs enhance resilience. Farmers become partners through cooperative models and shared hub ownership. Consumer programs normalize blended protein meals, and open-access dashboards build trust. Workforce reskilling and socio-economic inclusion prevent gaps.

Phase 2: 2036–2050 – Scaling and Consolidation

Advanced biotech-based ingredient production and side stream and waste treatment technologies scale up, powered by mandatory renewable energy. Breeding and agritech innovations strengthen plant diversity, and new business models have reinforced the role of farmers in the value chain. Cultural integration promotes hybrid recipes, and open data governance ensures traceability and transparency towards regulators and consumers. Nutrient and energy loop closure becomes standard, positioning Europe as a global leader in sustainable food trade.

The roughly estimated shares of animal-, plant-, and biotech-based protein ingredients shift over time towards a wide variety of plant- and biotech-based options. Animal-based proteins are commonly used in different blended products and dishes, keeping traditional culinary experiences available.



Key Insights

- **Policy evolution:** Transition from fragmented regulation to adaptive, participatory governance is critical for innovation.
- **Economic shift:** Circular business models and distributed hubs become central to competitiveness and resilience. Farmers are active partners in the evolving food systems, supported by new business models.
- **Social acceptance:** Consumer familiarization and inclusiveness programs build on experience, making sustainability a normal part of life.
- **Technology breakthroughs:** Breeding programs and agritech developments, advanced biotech-based ingredients, modular manufacturing and open data systems drive scalability and transparency.
- **Environmental imperatives:** Climate resilience and resource recovery are non-negotiable, circular and carbon-negative ecosystems are operational.
- **Legal harmonization:** Moving from restrictive IP frameworks to balanced, open data governance ensures collaboration and global leadership.

Strategic Priorities for Europe's Food System & PDDT Opportunities

Europe's food system is at a turning point, with a clear need to shift from slow, fragmented progress to a more collaborative, innovative, and inclusive approach. Stakeholders strongly prefer a future where circularity, regulatory agility, and diverse protein sources are the norm.

PDDT is positioned to catalyze this transition by fostering trust, supporting regulatory and financial innovation, promoting transparency, and ensuring that all regions and stakeholders are actively included in the journey toward a sustainable and resilient food system.